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M E M O R A N D U M

TO: John Mitnik, Assistant Executive Director, Executive Office Staff

FROM: SFWMD Staff Environmental Advisory Team

DATE: January 19, 2022

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

No rain is expected in the early part of the week as high pressure and dry air sits over the area. Widely scattered light showers are possible east Wednesday night. This moisture should spread over the southern half of the District Thursday with scattered afternoon showers developing mainly over the southern interior. Moisture should then continue to increase Thursday night ahead of an approaching cold front. The cold front is forecast to bring a widespread coverage of moderate to locally heavy thunderstorm activity Friday with shower activity continuing over the southern half of the District Saturday. It is currently uncertain whether the frontal boundary will push completely through the District or stall near the southern end of the District. Therefore, the currently quantitative precipitation forecast (QPF) keeps showers and thunderstorms over the southern and eastern portions of the District Sunday and Monday. During the first 7-day period (Week 1), rainfall is forecast to be above the historical average. The potential for some moderate to locally heavy rains next week will bring near historical average rainfall for the second 7-day period (Week 2).

Kissimmee

Flow at S-65A has been reduced to minimum discharge (~300 cfs) and water depth on the Kissimmee River floodplain is declining. Mean depth decreased to 0.18 feet as of January 16, 2022. The concentration of dissolved oxygen in the Kissimmee River has remained well above the region of concern, with an average of 8.1 mg/L for the week ending on January 16, 2022.

Lake Okeechobee

Lake Okeechobee stage was 15.20 feet NGVD on January 16, 2022 and it was 0.54 feet lower than a month ago. Lake stage fell back to within the ecological envelope on January 1, 2022, after being above the envelope since late September 2021, and having spent a total of 279 days (79%) in 2021 above the envelope. Average daily inflows (excluding rainfall) decreased from the previous week, going from 546 cfs to 476 cfs. Average daily outflows (excluding evapotranspiration) also decreased from the previous week, going from 3,729 cfs to 3,137 cfs. Recent satellite imagery (January 15, 2022) showed low to medium bloom potential along the western shorelines.

Estuaries

Total inflow to the St. Lucie Estuary averaged approximately 642 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities increased at all sites in the estuary over the past week. Salinity at the US1 Bridge was in the good range (10-26) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 2,199 cfs over the past week with 1,573 cfs coming from the Lake. Mean surface salinities remained low at S-79, increased slightly at Ft. Myers, and decreased at all remaining sites in the estuary over the past week. Salinities were in the good range (0-10) for tape grass at Val I-75 and Ft. Myers. Salinities were also in the good range (10-30) for adult eastern oysters at Cape Coral, Shell Point, and Sanibel.

Stormwater Treatment Areas

For the week ending Sunday, January 16, 2022, approximately 3,900 ac-ft of Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2022 (since May 1, 2021) is approximately 75,000 ac-feet. The total amount of inflows to the STAs in WY2022 is approximately 960,000 ac-feet. Most STA cells are at or near target stage, except STA-5/6 cells that are starting to dry out. STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, and STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways for construction activities. Operational restrictions are in effect in STA-1E Central Flow-way and STA-2 Flow-ways 3 and 4 for vegetation management activities. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

Everglades

For the first time since early November 2021, rates of stage change across the Everglades were mostly in the good range last week. Depths are low in northern WCA-3A and stages are below the historic median at the four main gauges in that conservation area. In Florida Bay salinities increased last week especially in the near shore, and stages fell slightly in Taylor Slough. Salinities in the central region once again exceeded the 75th percentile and conditions remain less than ideal for the Florida Bay system to tolerate a drier than average dry season.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On January 16, 2022, lake stages were 57.9 feet NGVD (0.1 feet below schedule) in East Lake Toho, 54.5 feet NGVD (0.5 feet below schedule) in Lake Toho, and 50.2 feet NGVD (2.3 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1; Figures KB-1-3**).

Lower Kissimmee

Discharges to the Kissimmee River on January 16, 2022 were 330 cfs at S-65 and 310 cfs at S-65A; discharges from the Kissimmee River were 350 cfs at S-65D and 380 cfs at S-65E (**Table KB-2**). Headwater stages were 46.3 feet NGVD at S-65A and 26.6 feet NGVD at S-65D on January 16, 2022. With lower water temperatures, little rainfall, and reduced discharge at S-65A, the concentration of dissolved oxygen has remained well above the region of concern, with an average of 8.1 mg/L for the week ending on January 16, 2022 (**Table KB-2, Figure KB-4**). Flow at S-65A has been reduced to minimum discharge (~300 cfs) and water depth on the Kissimmee River floodplain is declining. Mean depth decreased to 0.18 feet as of January 16, 2022 (**Figure KB-5**).

Water Management Recommendations

Managed stage recessions for snail kite nesting season were started on Lakes Toho and East Toho on January 15, 2022 to gradually reduce lake stages to their low pools by June 1. In Kissimmee-Cypress-Hatchineha, continue to maintain at least 300 cfs at S-65A and follow the IS-14-50 discharge plan (**Figure KB-6**) for S-65 and S-65A for the remainder of dry season.

Table KB-1. Average discharge for the preceding seven days and Sunday’s average daily stage and departures from KCL flood regulation or temporary schedules. All data are provisional.

Water Body	Structure	Stage Monitoring Site	7-Day Average Discharge (cfs)	Lake Stage (feet NGVD) ^a	Schedule Type ^b	Schedule Stage (feet NGVD)	Departure from Regulation (feet)	
							1/16/22	1/9/22
Lakes Hart and Mary Jane	S-62	LKMJ	12	61.0	R	61.0	0.0	0.0
Lakes Myrtle, Preston and Joel	S-57	S-57	8	61.5	R	61.5	0.0	-0.1
Alligator Chain	S-60	ALLI	0	63.9	R	64.0	-0.1	-0.1
Lake Gentry	S-63	LKGT	1	61.5	R	61.5	0.0	0.0
East Lake Toho	S-59	TOHOE	14	57.9	R	58.0	-0.1	-0.1
Lake Toho	S-61	TOHOW S-61	120	54.5	R	55.0	-0.5	-0.5
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	333	50.2	R	52.5	-2.3	-2.3

a. Names of in-lake monitoring sites and structures used to determine lake stage. If more than one site is listed, an average is reported.

b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.

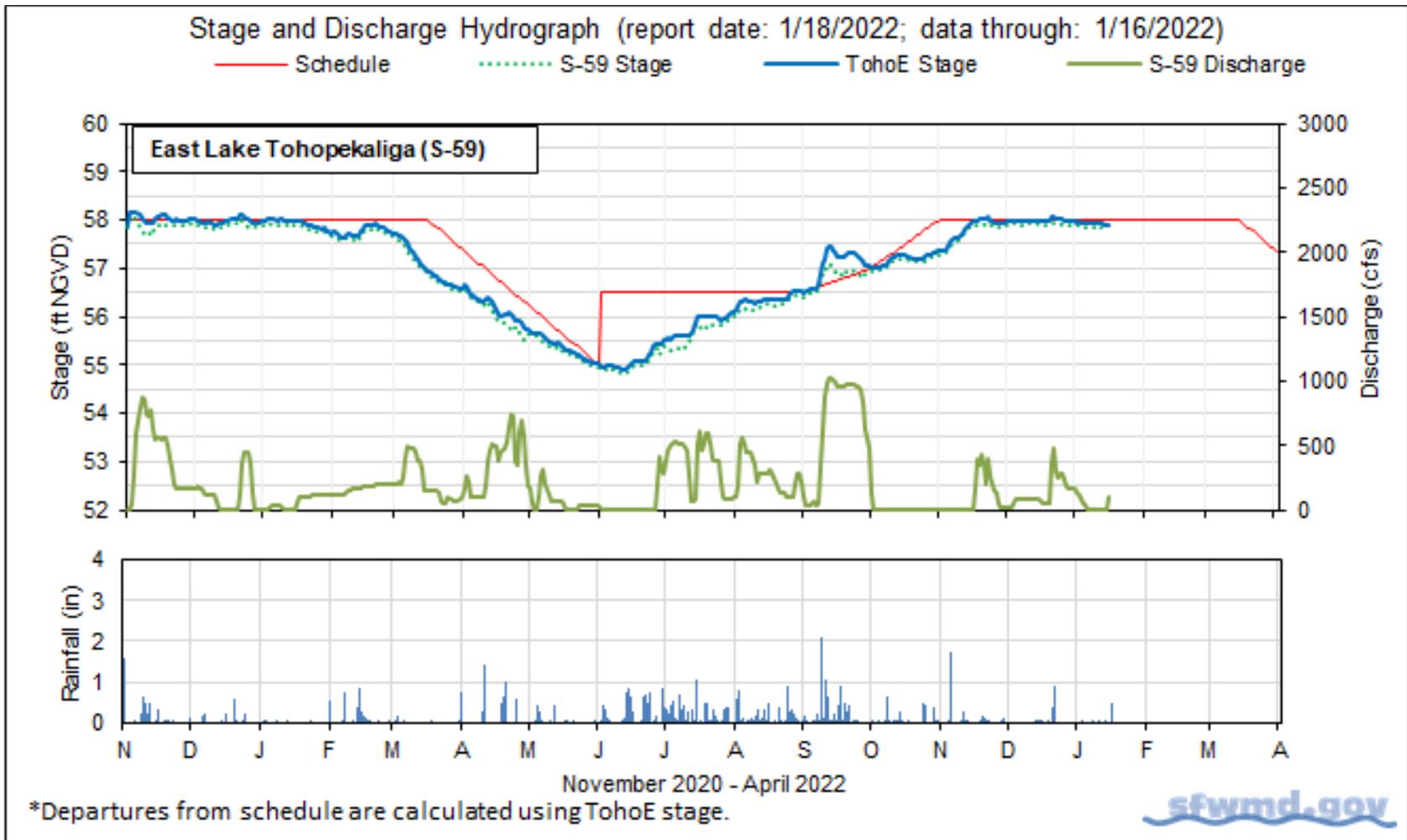


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

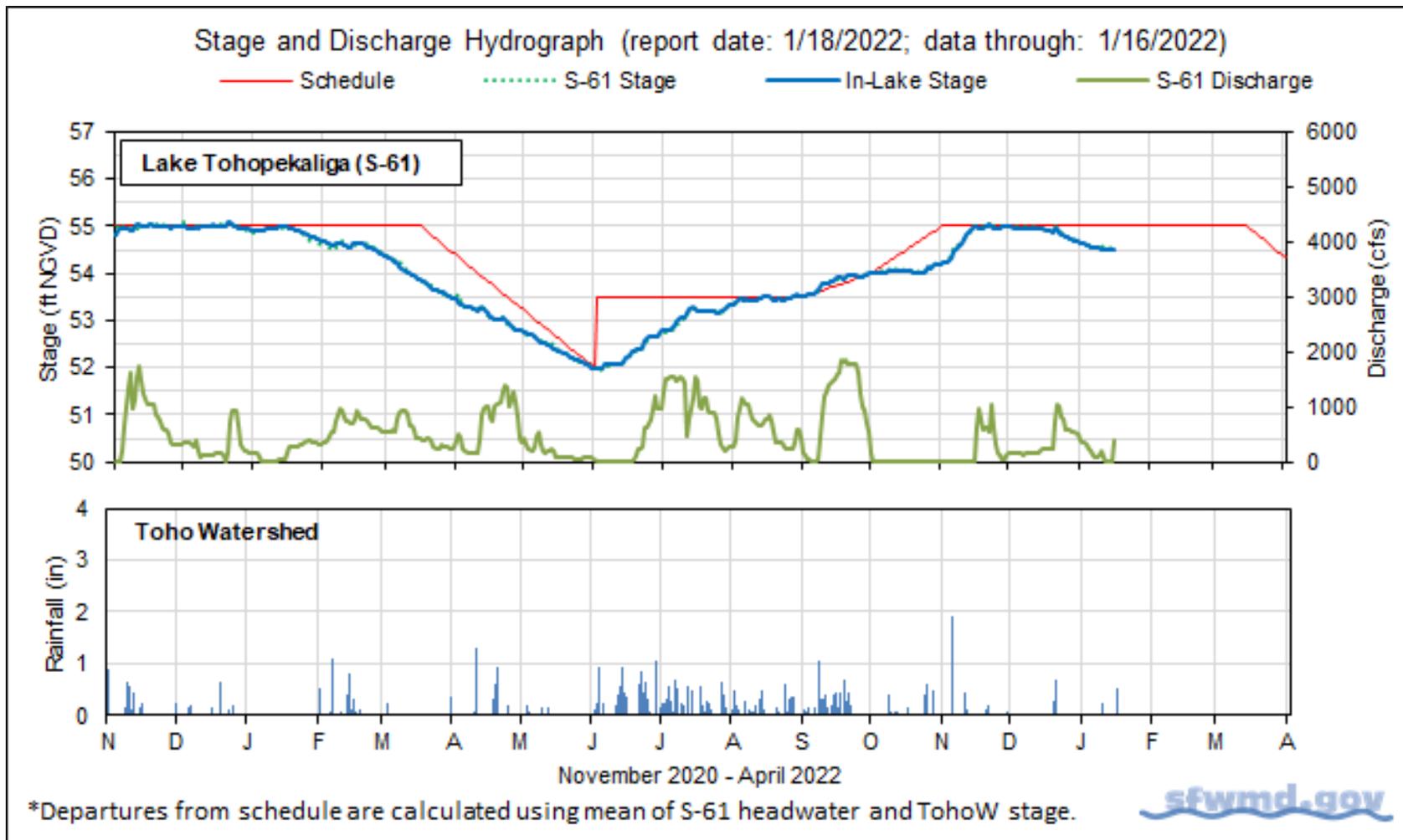


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

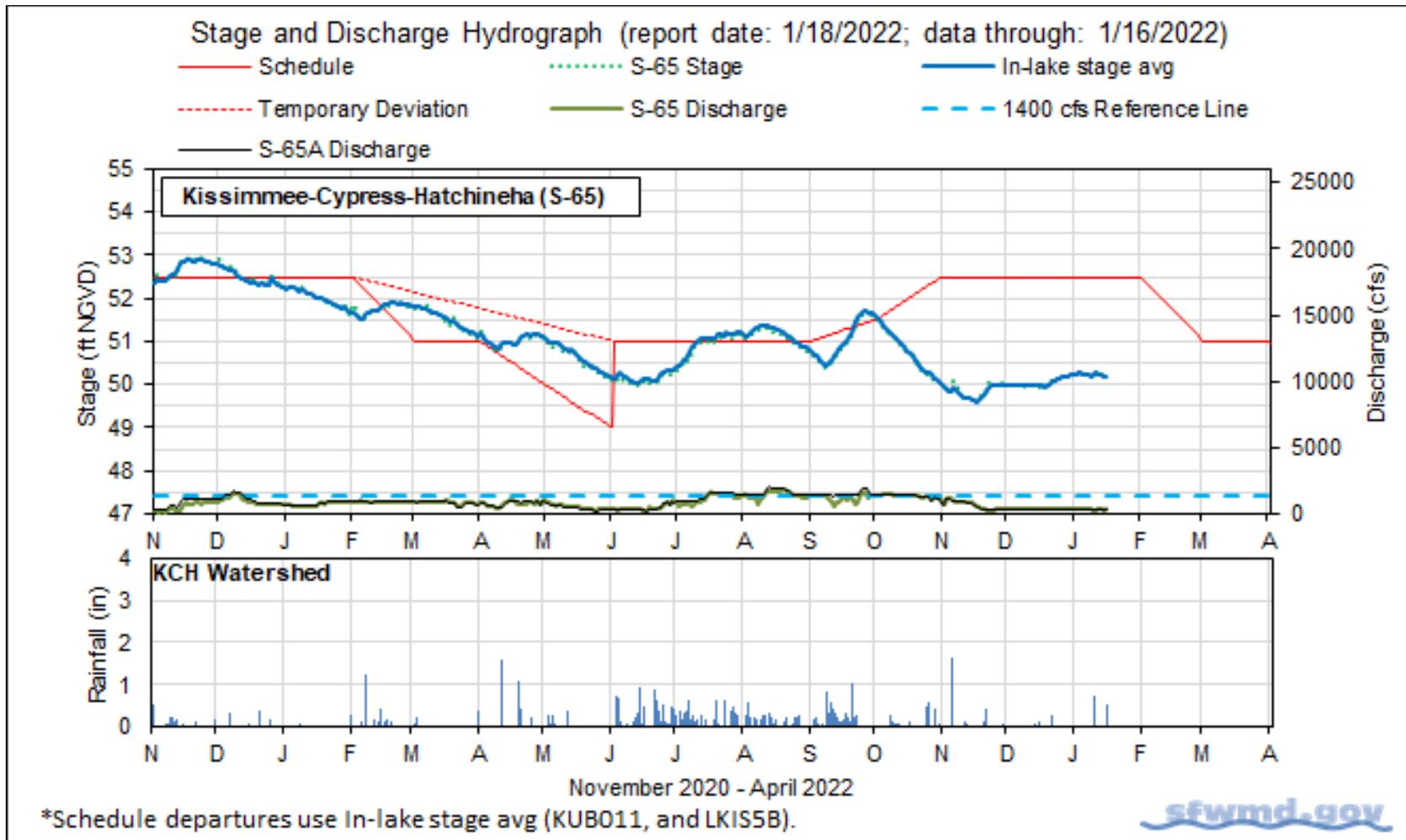


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

Table KB-2. One- and seven-day average discharge and stage at Lower Kissimmee basin structures, river channel dissolved oxygen concentrations and water depths in the Phase I area floodplain. All data are provisional.

Metric	Location	Daily Average 1/16/22	Average for Previous Seven Day Periods			
			1/16/22	1/9/22	1/2/22	12/26/21
Discharge	S-65	330	330	360	380	370
Discharge	S-65A ^a	310	290	290	310	310
Headwater Stage (feet NGVD)	S-65A	46.3	46.4	46.3	46.3	46.3
Discharge	S-65D ^b	350	310	340	370	380
Headwater Stage (feet NGVD)	S-65D ^c	26.6	26.5	26.5	26.5	26.4
Discharge (cfs)	S-65E ^d	380	340	340	380	380
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	8.1	8.1	8.0	7.5	7.4
Mean depth (feet) ^f	Phase I floodplain	0.18	0.18	0.20	0.23	0.26

a. Combined discharge from main and auxiliary structures.

b. Combined discharge from S-65D, S-65DX1 and S-65DX2.

c. Average stage from S-65D and S-65DX1.

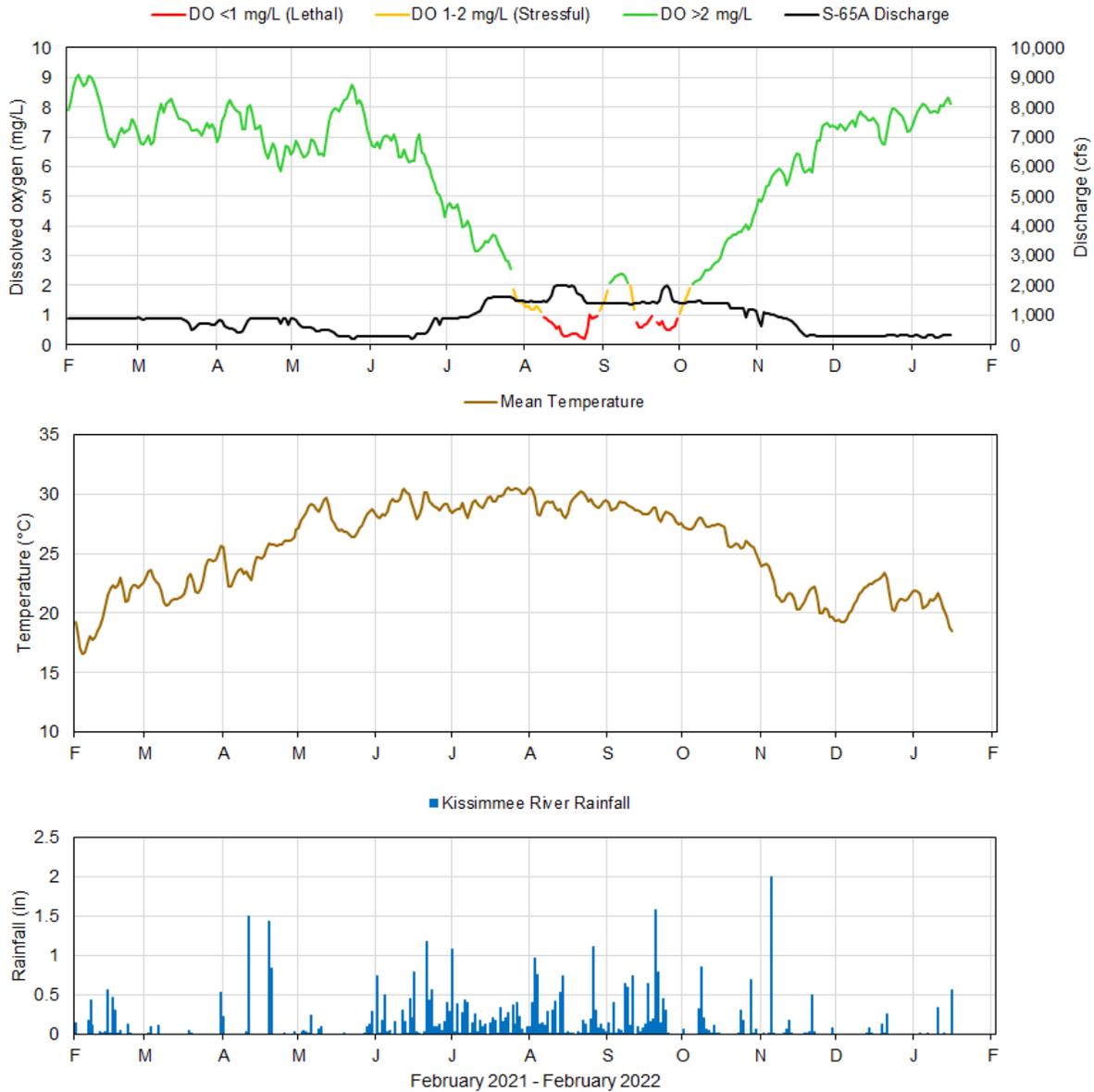
d. Combined discharge from S-65E and S-65EX1.

e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC33, PD62R and PD42R.

f. One-day spatial average obtained from the South Florida Water Depth Assessment Tool (SFWDAT).

Table KB-3. Discharge rate of change limits for S65/S-65A (revised 1/14/19).

Discharge (cfs)	Maximum Rate of Increase (cfs/day)	Maximum Rate of Decrease (cfs/day)
0-300	100	-50
301-650	150	-75
651-1,400	300	-150
1,401-3,000	600	-600
>3,000	1,000	-2,000



Report Date: 1/18/2022; data are through: 1/16/2022



Figure KB-4. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R, and PD42R with an average of two stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

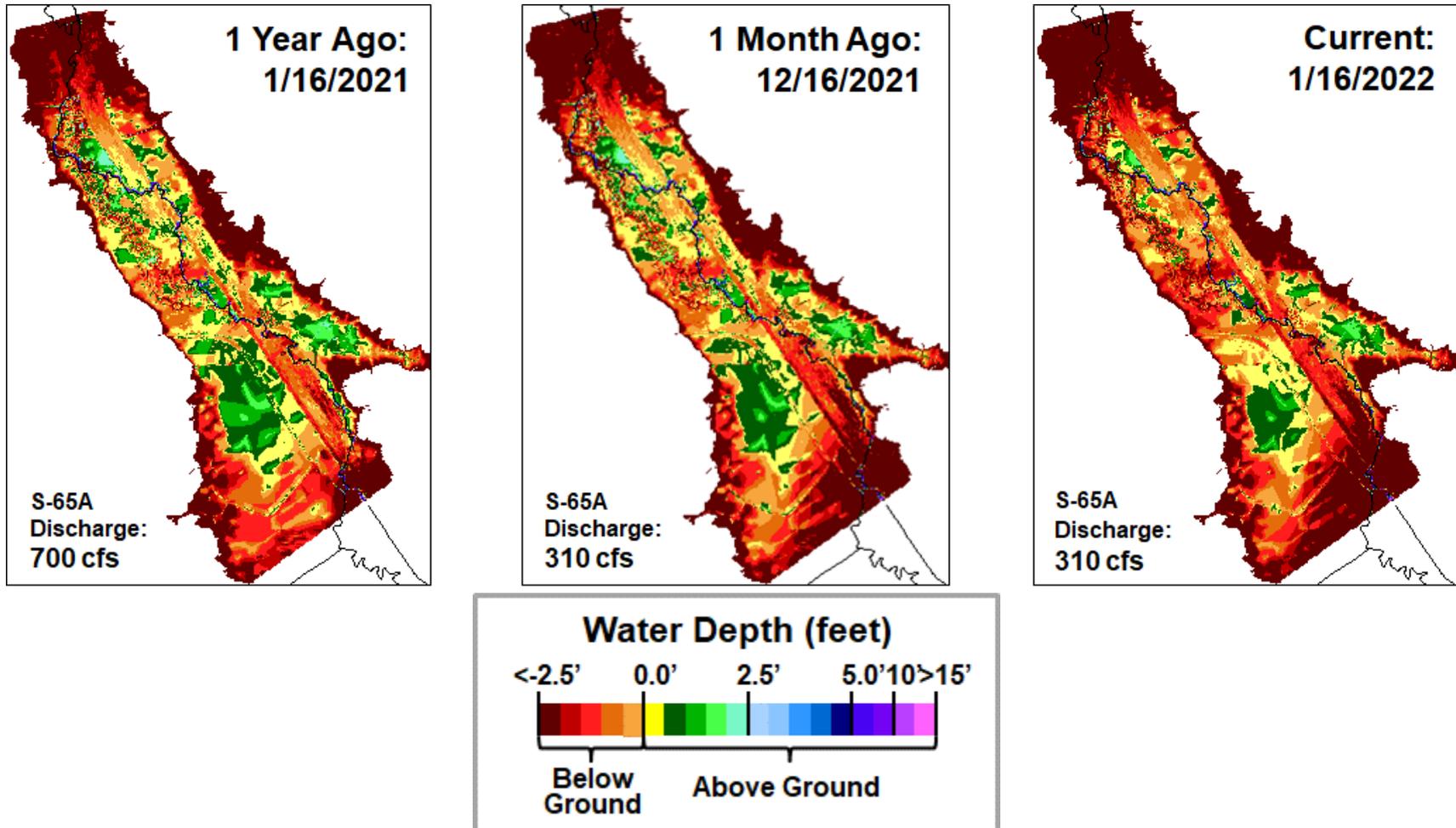


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

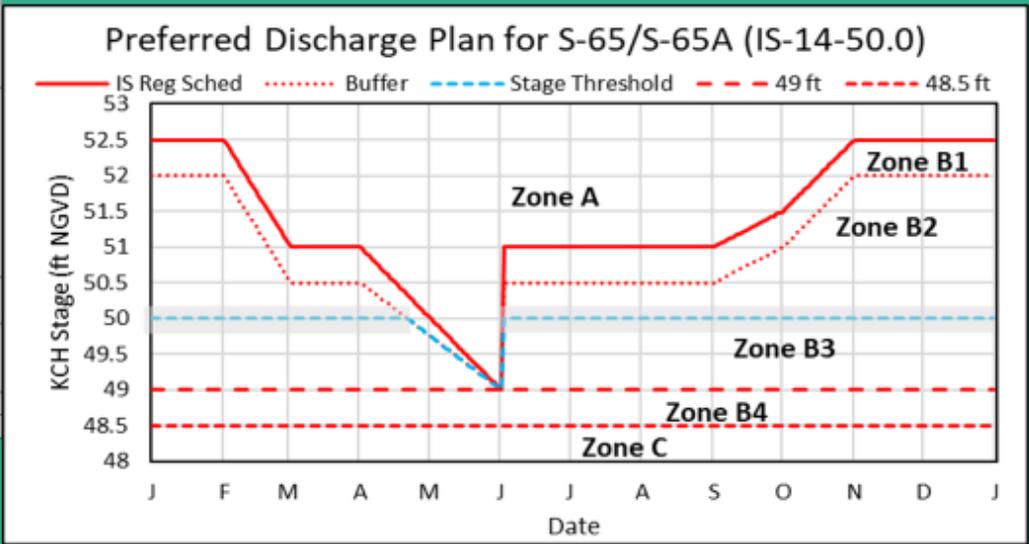
Stage and Discharge Guidance for 2021-2022.		
Zone	KCH Stage (ft NGVD)	S-65/S-65A Discharge*
A	Above regulation schedule line.	Flood control releases as needed with no limits on the rate of discharge change.
B1	In flood control buffer zone (0.5 ft below the schedule line).	Adjust S-65 discharge so that S-65A discharge is between 1400 cfs at the buffer zone line and 3000 cfs at the schedule line.
B2	Between the Flood Control Buffer and the 50.0 ft line.	Adjust S-65 discharge to maintain at least 1400 cfs at S-65A. Use ± 0.2 ft buffer (gray band) above and below the 50.0 ft line to decide when to begin ramping up to 1400 cfs or down to 300 cfs; do not continue reducing discharge if stage rises back to or above the threshold stage line.
B3	Between the 50.0 ft line and 49 ft.	Adjust S-65 discharge to maintain at least 300 cfs at S-65A.
B4	Between 48.5 ft to 49 ft.	Adjust S-65 discharge to maintain S-65A discharge between 0 cfs at 48.5 ft and 300 cfs at 49 ft.
C	Below 48.5 ft.	0 cfs.

*Changes in discharge should not exceed limits in inset table below.

Table KB-3. Discharge Rate of Change Limits for S65/S65A (revised 1/14/19).		
Q (cfs)	Maximum rate of INCREASE (cfs/day)	Maximum rate of DECREASE (cfs/day)
0-300	100	-50
301-650	150	-75
651-1400	300	-150
1401-3000	600	-600
>3000	1000	-2000



2021-2022 Discharge Plan for S-65/S-65A



- Other Considerations**
- When possible, limit lake ascension rate in the Jun 1 - Aug 15 window to 0.25 ft per 7 days in Lakes Kissimmee, Cypress, Hatchineha (S-65), East Toho (S-59) and Toho (S-61).
 - If outlook is for extreme dry conditions meet with KB staff to discuss modifications to this plan.

Slide Revised 1/3/2022

Figure KB-6. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 15.20 feet NGVD on January 16, 2022, with water levels 0.54 feet lower than a month ago (**Figure LO-1**). Lake stage remains in the Low sub-band (**Figure LO-2**) and is still within the ecological envelope, having spent 279 days (79%) of the last year above the envelope (**Figure LO-3**). According to NEXRAD, 0.97 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 546 cfs to 476 cfs. Average daily outflows (excluding evapotranspiration) also decreased from the previous week, going from 3,729 cfs to 3,137 cfs. Highest inflows came from the Kissimmee River through the S-65E structure (342 cfs). The highest outflow (1,421 cfs) was to the west via the S-77 structure, while 983 cfs flowed south via the S-350 structures (S-351, 785 cfs; S-352, 175 cfs; S-354, 126 cfs). There was 665 cfs of outflow to the east via the S-308 structure. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

The most recent satellite image (January 15, 2022) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor showed a medium bloom potential along the western shorelines (**Figure LO-6**). The January 4-5, 2022 water quality survey results revealed that 8 of the 10 sites surveyed had microcystin concentrations above detection levels (0.25 µg/L), but all were less than 1 µg/L and had mixed cyanobacteria communities. Chlorophyll a results showed 3 of 30 sites (Polesout, L005, and Palmout) had values above the SFWMD bloom threshold (40 µg/L), and a further 9 sites had values above 20 µg/L. The January 4-5, 2022 survey results are shown in **Table LO-1** and **Figure LO-7**.

**1 Month Ago:
12/17/2021**

**Current:
01/16/2022**

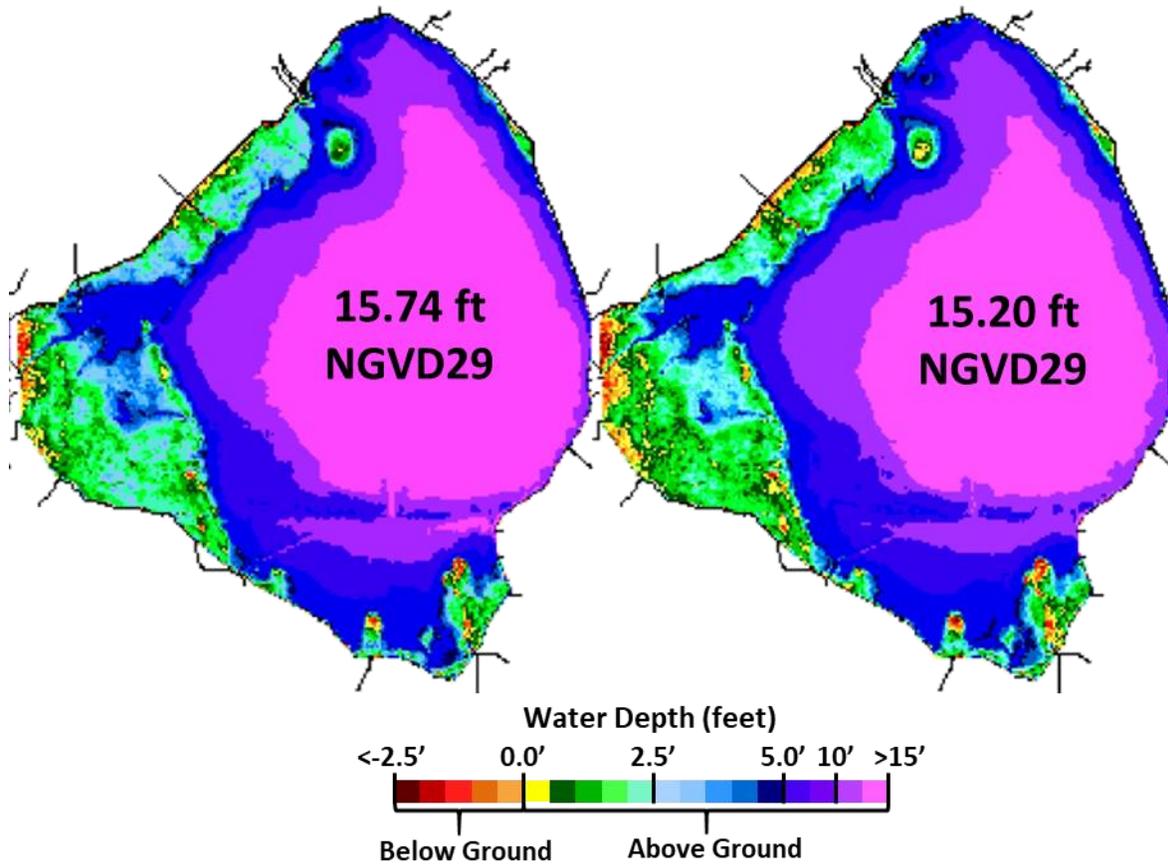
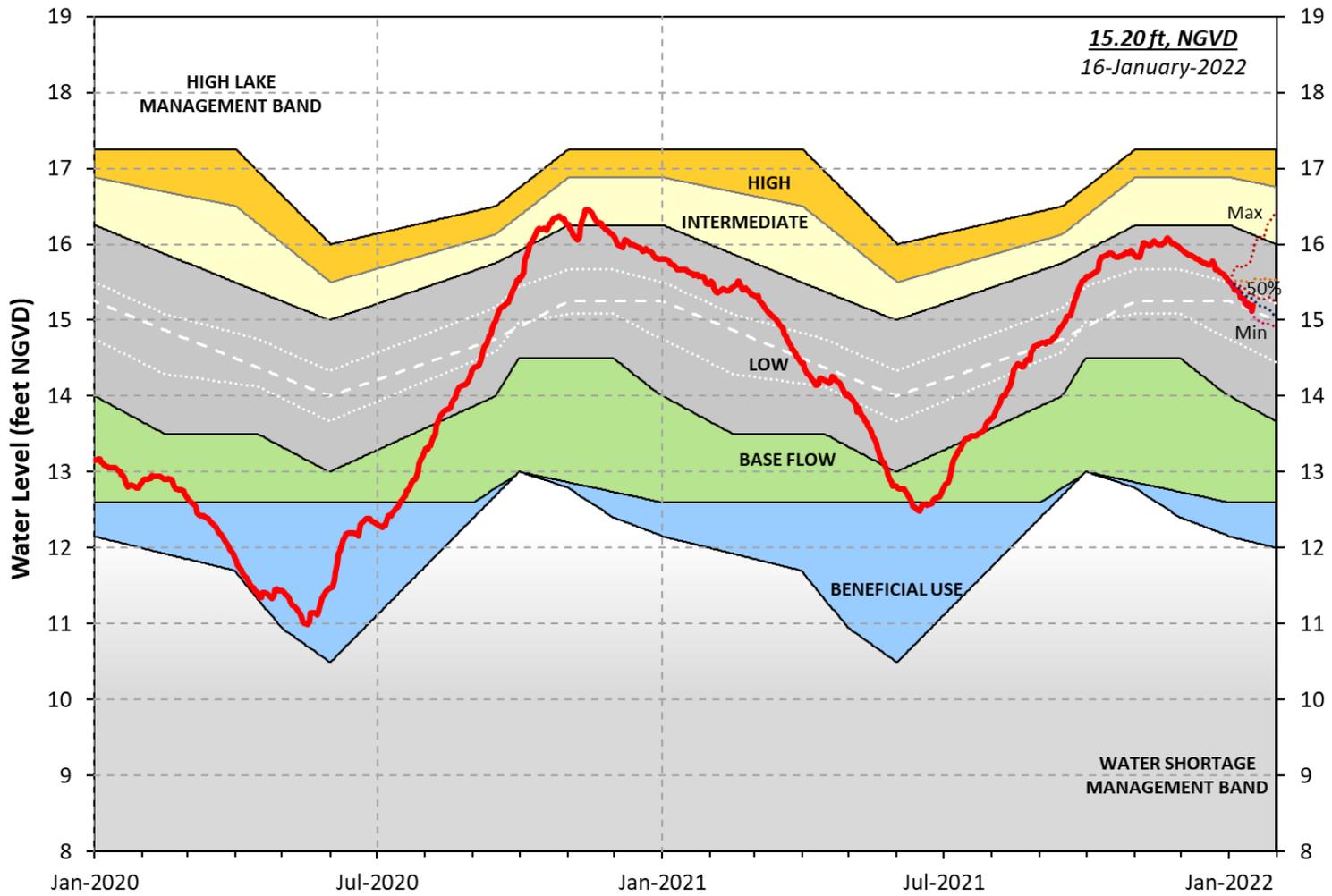


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages



LORS-2008 - Adopted by USACE 28-April-2008

Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

Lake Okeechobee Stage vs Ecological Envelope

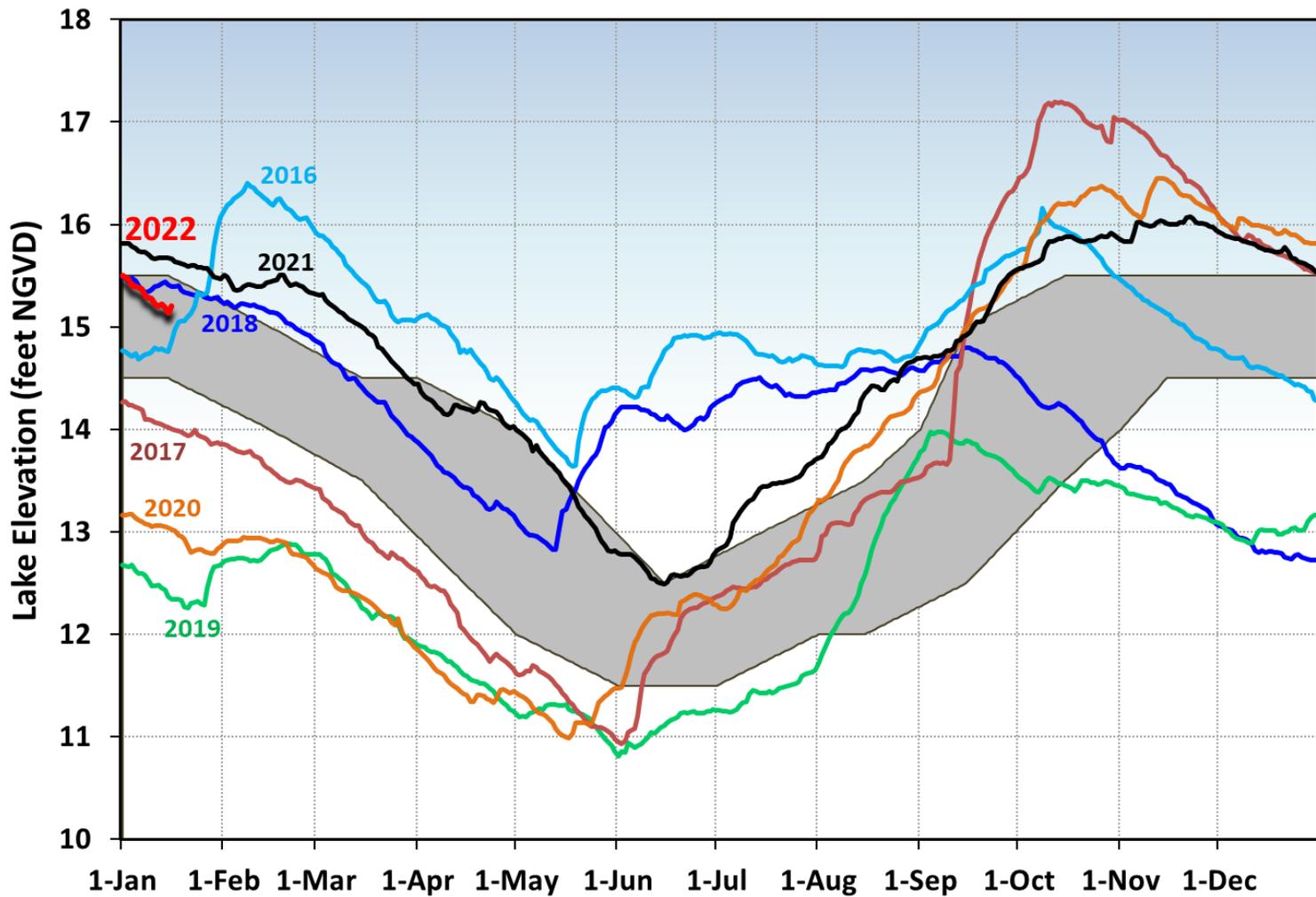


Figure LO-3. The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

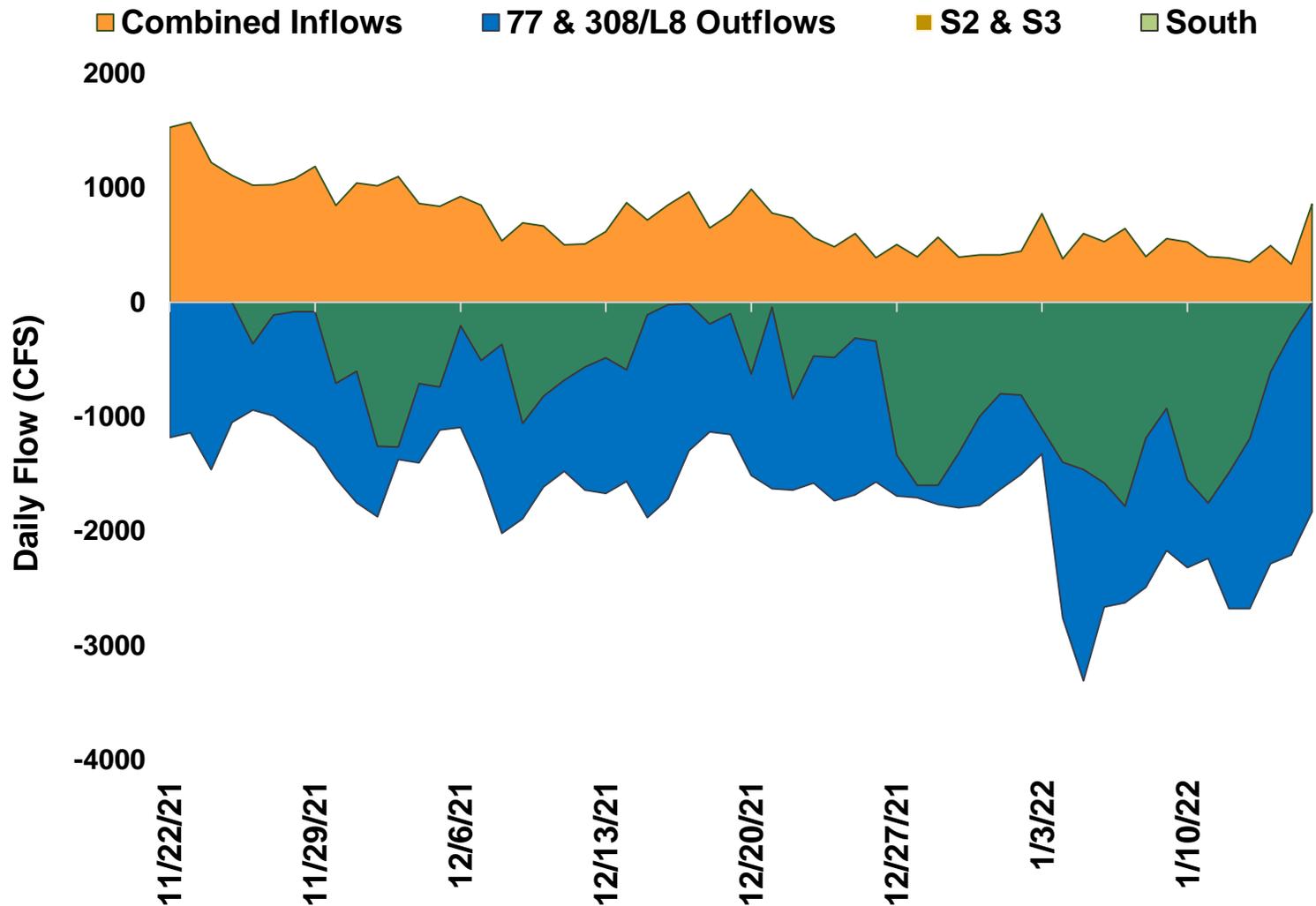


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 or C-44 canals are included with outflows. Inflows are shown as positive values; outflows are negative. Outflows through the S-77 (Caloosahatchee) and S-308 (C-44 Canal) structures are based on downstream gauges to include flows to lock openings for navigation.

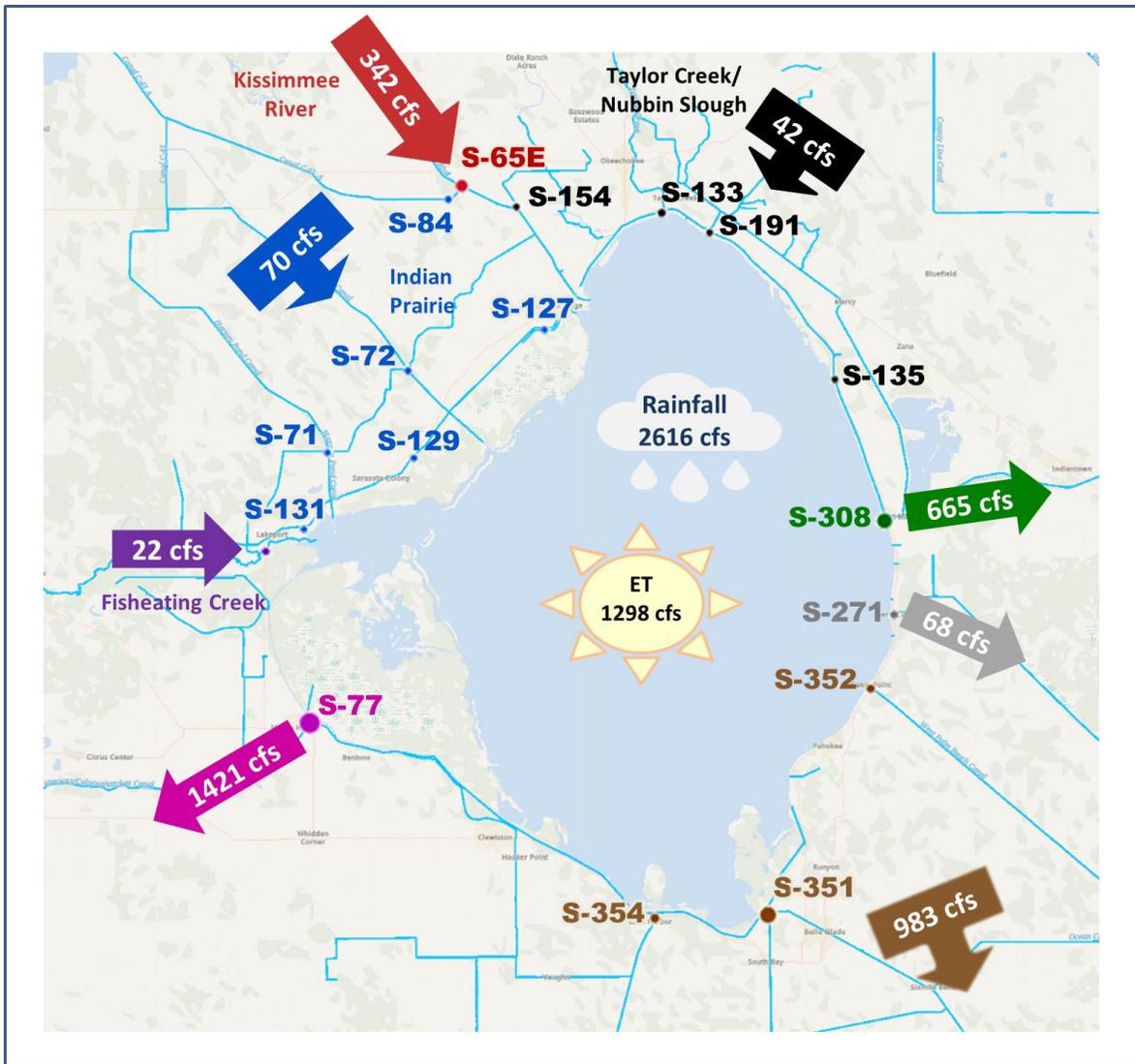


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of January 10, 2022 – January 16, 2022.

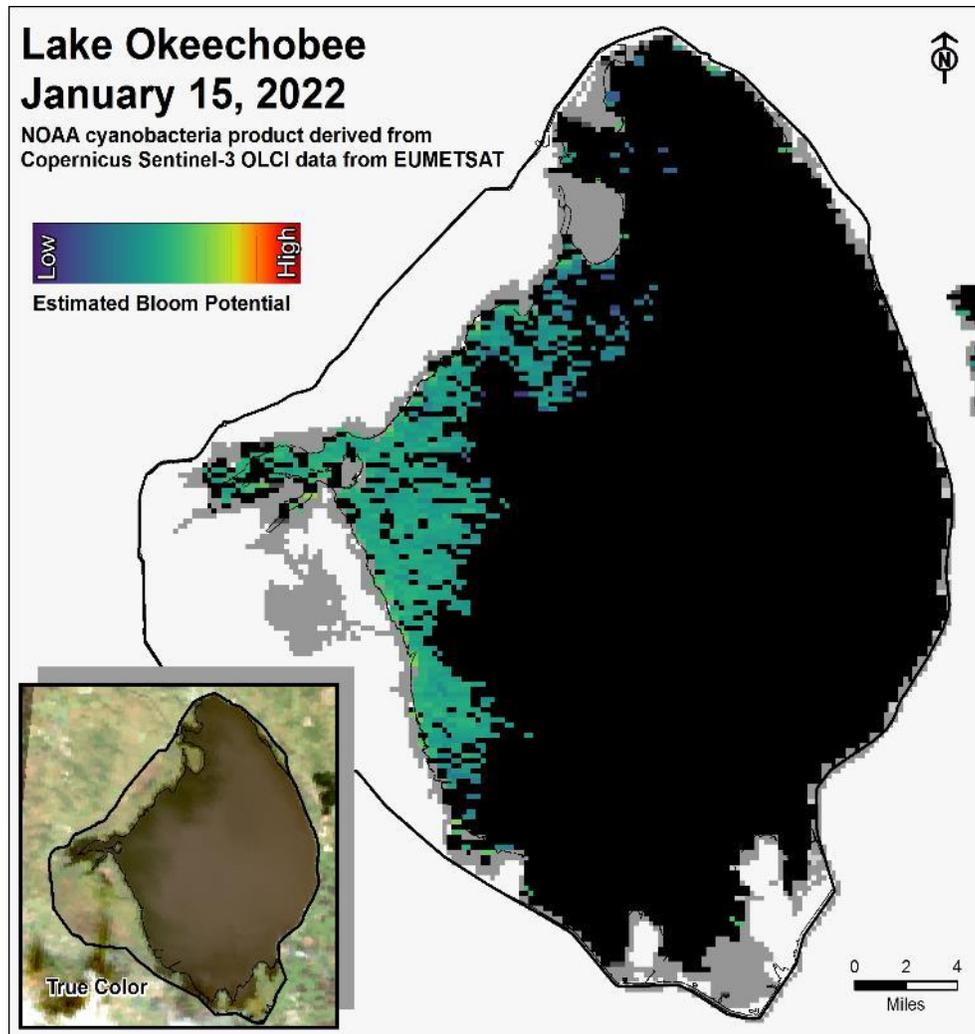


Figure LO-6. Cyanobacteria bloom potential on January 15, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Table LO-1. Provisional results of chlorophyll *a* concentrations and cyanobacteria taxa from sampling trips on January 4-5, 2022. Color coding generally follows the legend in **Figure LO-7**.

Collection Date: January 4-5, 2022

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN	NS		
FEBOUT	NS		
KISSRO.0	21.9	0.3	<i>mixed</i>
L005	40.0	0.4	<i>mixed</i>
LZ2	20.5	BDL	<i>mixed</i>
KBARSE	26.2		
RITTAE2	30.9	0.3	<i>mixed</i>
PELBAY3	5.3		
POLE3S	26.1		
LZ25A	6.9		
PALMOUT	44.3	0.5	<i>mixed</i>
PALMOUT1	32.0		
PALMOUT2	5.1		
PALMOUT3	6.5		
POLESOUT	42.6	0.4	<i>mixed</i>
POLESOUT1	39.4		
POLESOUT2	14.8		
POLESOUT3	12.0		
EASTSHORE	13.6		
NES135	11.1		
NES191	9.6		

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
L001	22.9		
L004	8.4		
L006	4.6		
L007	5.5		
L008	9.3		
LZ30	5.3	0.4	<i>mixed</i>
LZ40	4.2		
CLV10A	7.4	0.4	<i>mixed</i>
NCENTER	22.4		

sampled 12/27/2021

S308C	10.8	0.3	<i>mixed</i>
S77	9.6	BDL	<i>mixed</i>

- SFWMD considers >40 µg/L Chlorophyll *a* (Chla) an algal bloom
- BDL – Below Detectable Limit of 0.25 µg/L
- ND – No Dominant taxa
- P – Pending
- NS – Not Sampled
- Station bold font – crew observed possible BGA
- Chlorophyll *a* analyzed by SFWMD
- Toxin and Taxa analyzed by FDEP:
Microcys = *Microcystis*; *Cylindro* = *Cylindrospermopsis*; *Planktol* = *Planktolyngbya*;
Dolicho = *Dolichospermum*

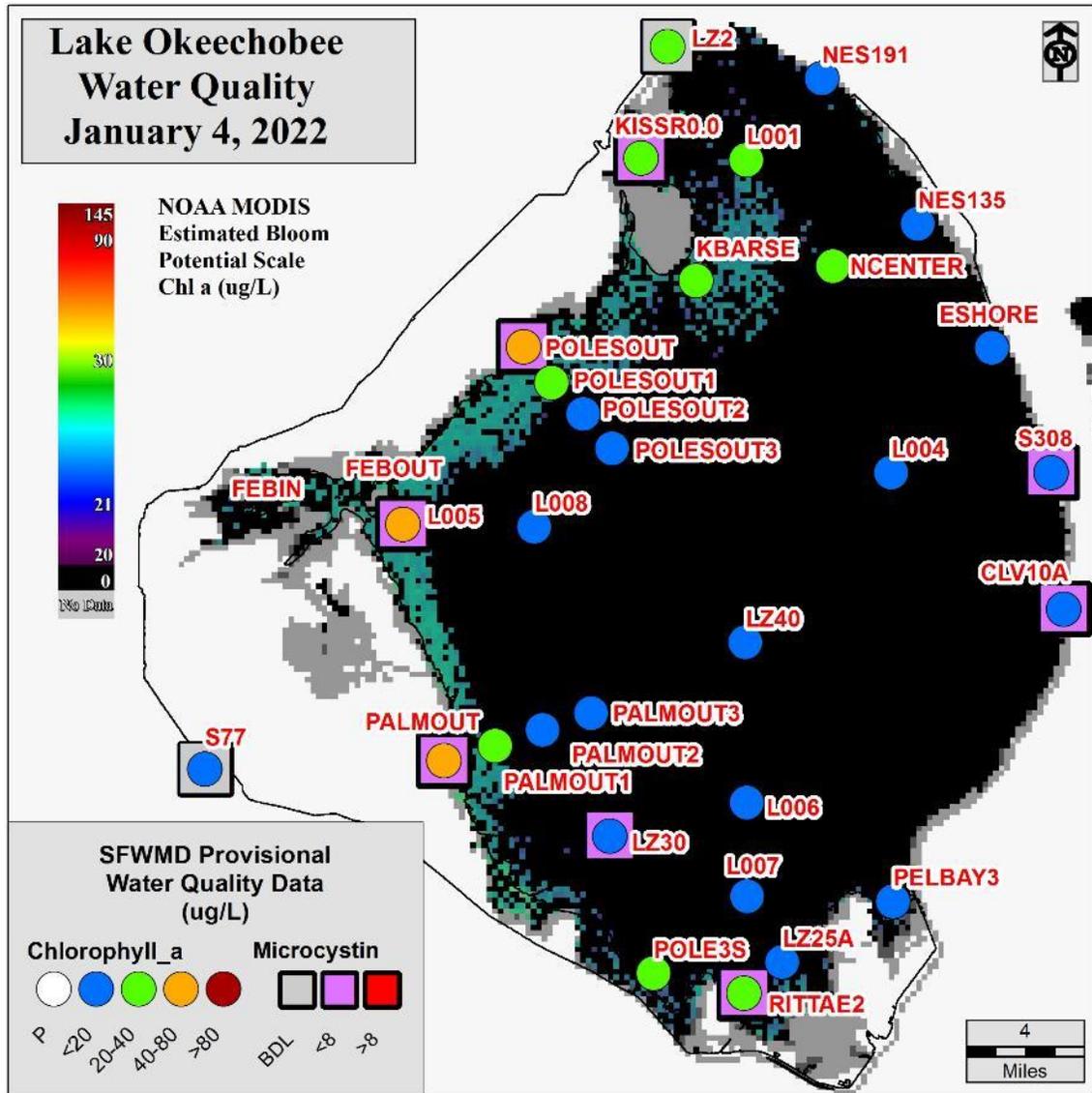


Figure LO-7. Expanded monitoring network and provisional results from samples collected January 4-5, 2022.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was approximately 642 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was approximately 547 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities increased at all sites within the estuary (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 21.7. Salinity conditions in the middle estuary were estimated to be within the good range for adult eastern oysters (**Figure ES-4**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was approximately 2,199 cfs (**Figures ES-5 and ES-6**) and the previous 30-day mean inflow was approximately 2,132 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, surface salinities remained the same at S-79 and Val I-75, increased at Ft. Myers, and decreased at the remaining sites in the estuary (**Table ES-2 and Figures ES-7 and ES-8**). The seven-day mean surface salinities (**Table ES-2**) were in the good range (0-10) for tape grass at Val I-75 and at Ft. Myers. The seven-day mean surface salinity values were within the good range for adult eastern oysters at Cape Coral, Shell Point, and Sanibel (**Figure ES-9**).

Surface salinity at Val I-75 was forecasted for the next two weeks, using an autoregression model (Qiu and Wan, 2013¹) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1500 cfs and a steady release at 2,000 cfs with estimated tidal basin inflows of 92 cfs. Model results from all scenarios predict daily salinity to be 1.0 or lower and the 30-day moving average surface salinity to be 0.3 at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-10**). This keeps predicted salinities at Val I-75 within the LORS 2008 salinity range (0.0-5.0).

Red Tide

The Florida Fish and Wildlife Research Institute reported on January 14, 2022, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed within the District region. On the east coast, red tide was not observed in samples from St. Lucie, Martin, or Palm Beach counties.

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are Dry. The LORS2008 release guidance suggests up to 450 cfs release at S-79 to the Caloosahatchee River Estuary and up to 200 cfs release at S-80 to the St. Lucie Estuary.

¹ Qiu, C., and Y. Wan. 2013. Time series modeling and prediction of salinity in the Caloosahatchee River Estuary. *Water Resources Research* 49:5804-5816.

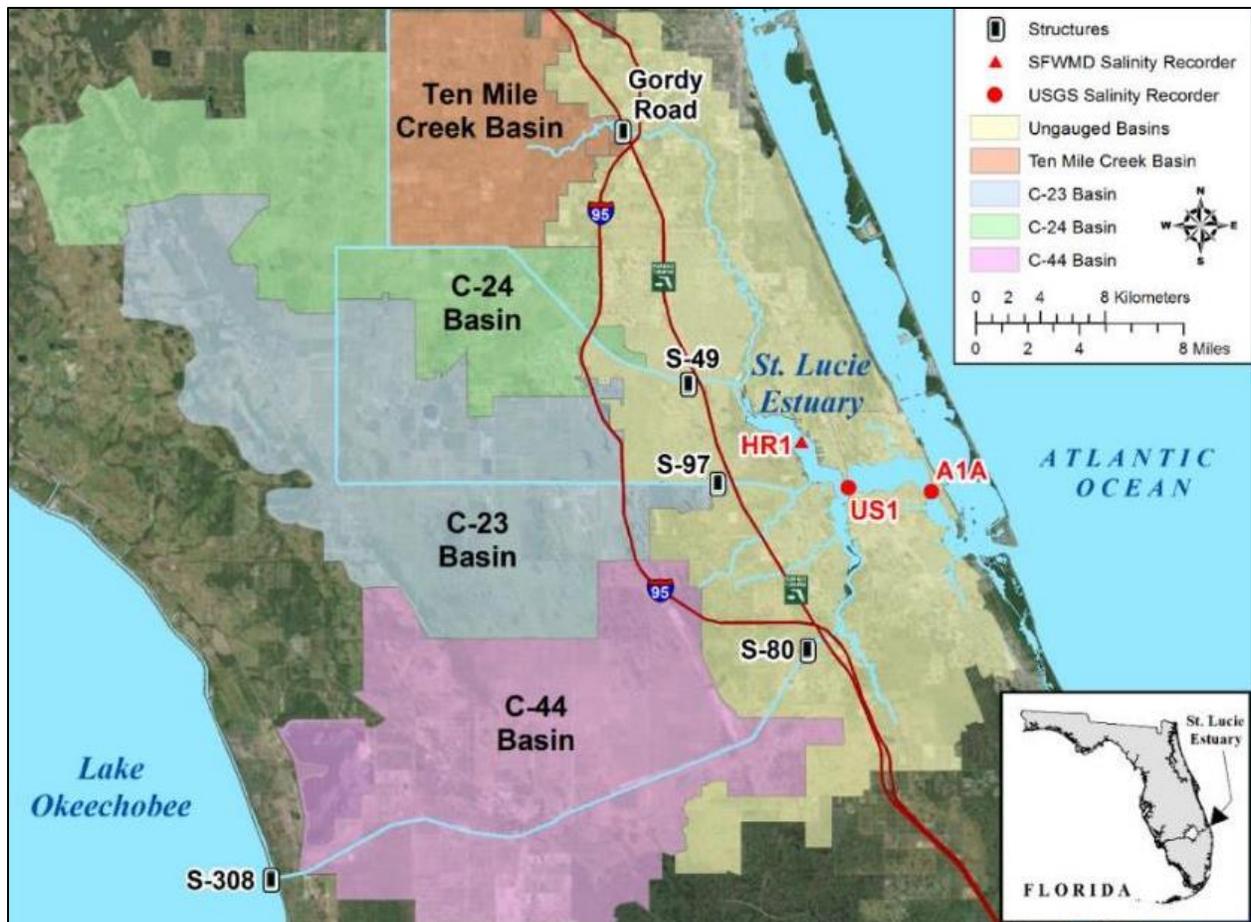


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

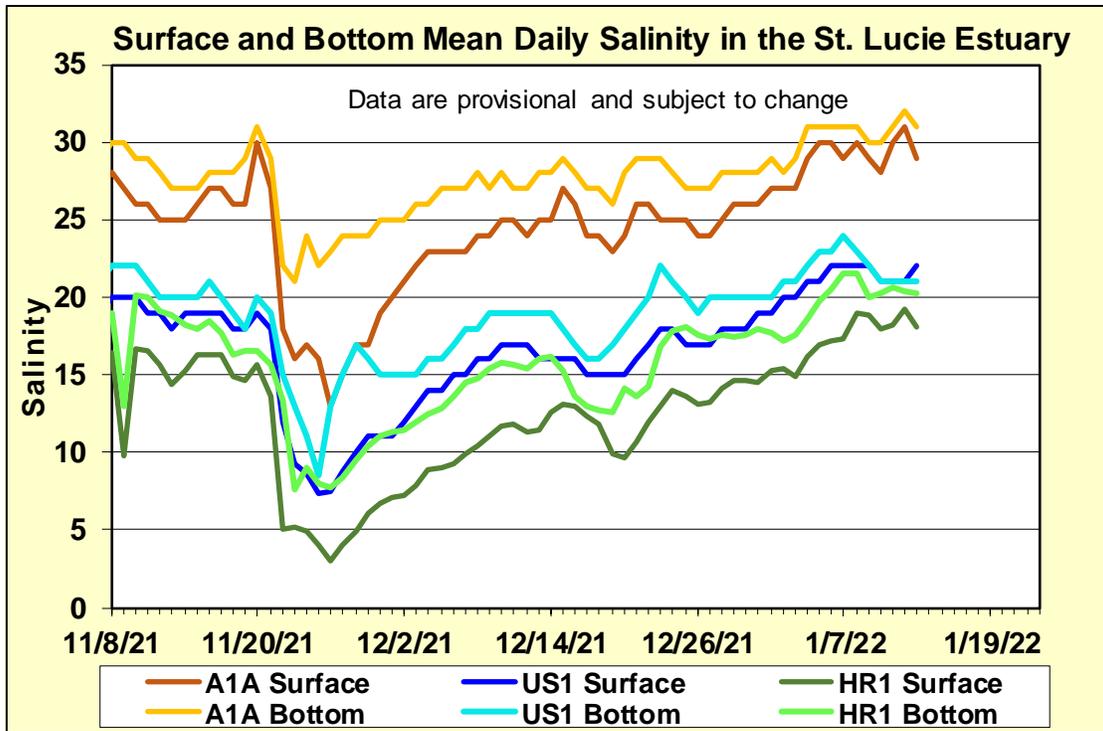


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

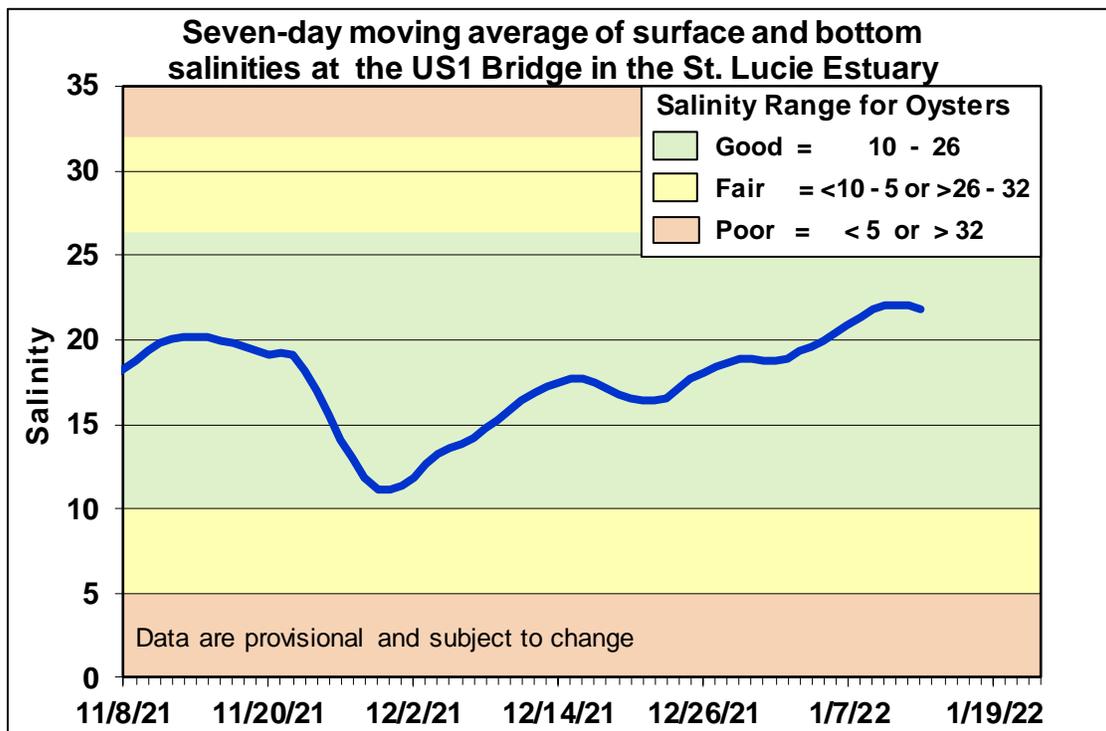


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

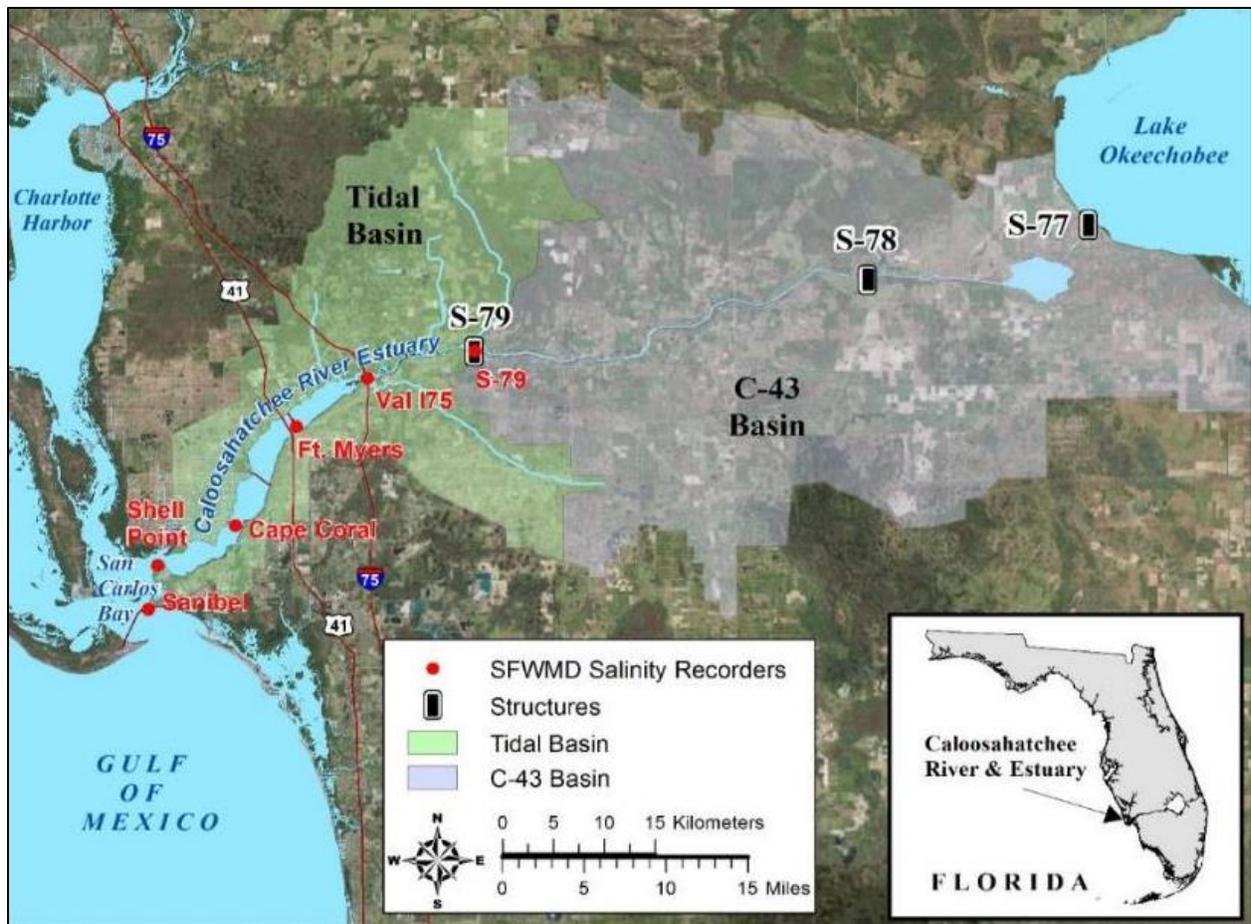


Figure ES-5. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

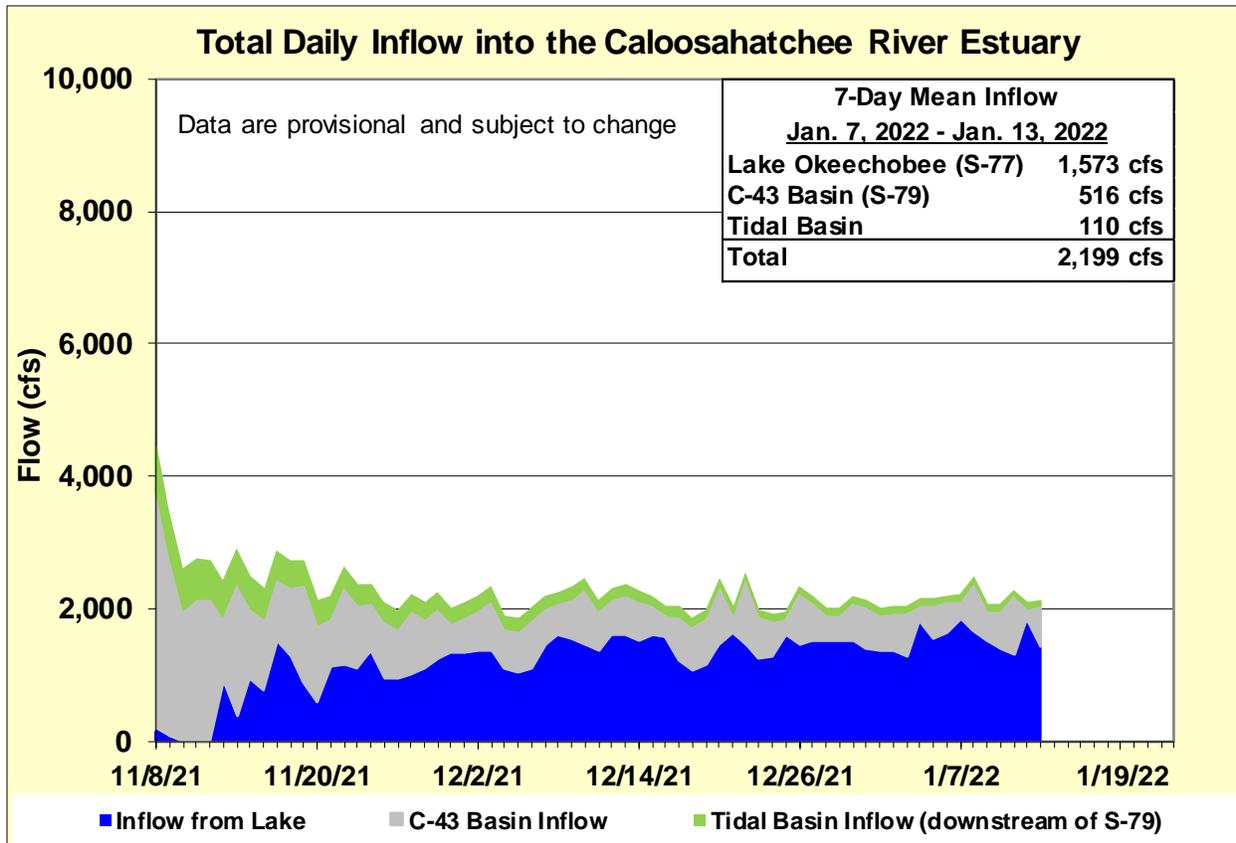


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

Table ES-2. Seven-day mean salinity at six monitoring sites in the Caloosahatchee River Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope at I-75 is for the protection of tape grass in the upper estuary and the envelope in the lower estuary is the preferred salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	0.2 (0.2)	0.2 (0.2)	NA ^a
Val I-75	0.3 (0.3)	0.5 (0.3)	0.0 – 5.0 ^b
Fort Myers Yacht Basin	2.9 (2.8)	5.2 (3.7)	NA ^a
Cape Coral	9.3 (11.5)	11.3 (12.8)	10.0 – 30.0
Shell Point	21.0 (24.0)	23.9 (26.0)	10.0 – 30.0
Sanibel	29.0 (29.6)	29.8 (30.1)	10.0 – 30.0

a. The envelope is not applicable.

b. The envelope is based on the predicted 30-day mean for the next two weeks.

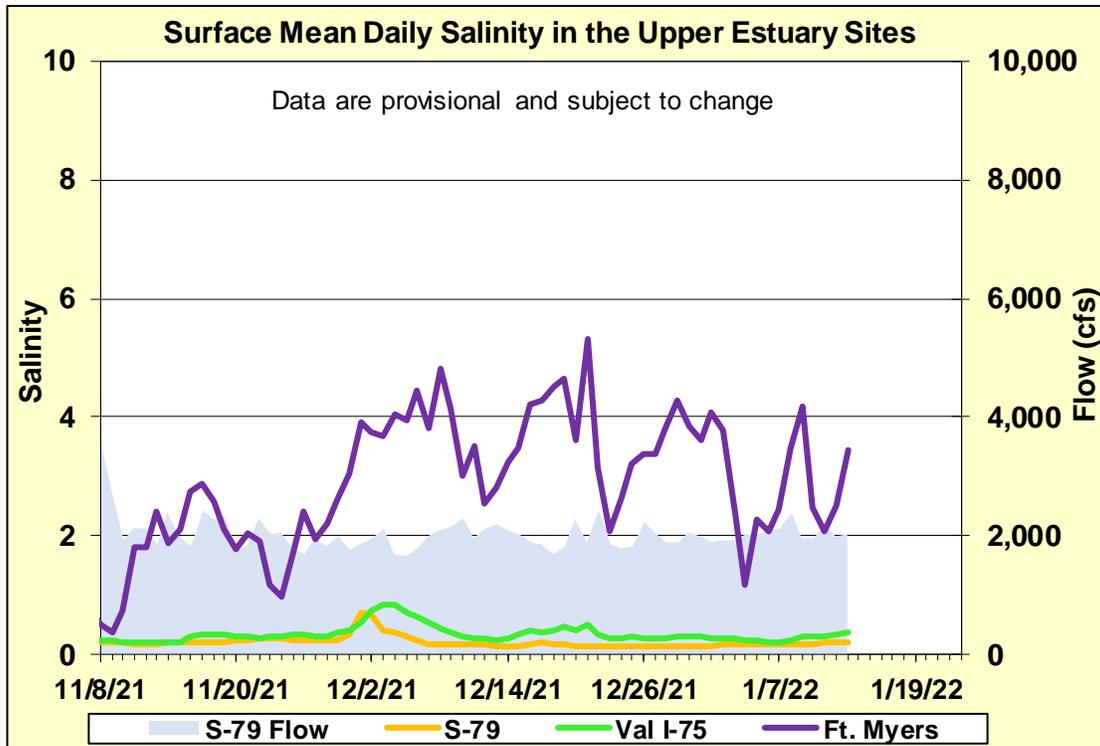


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

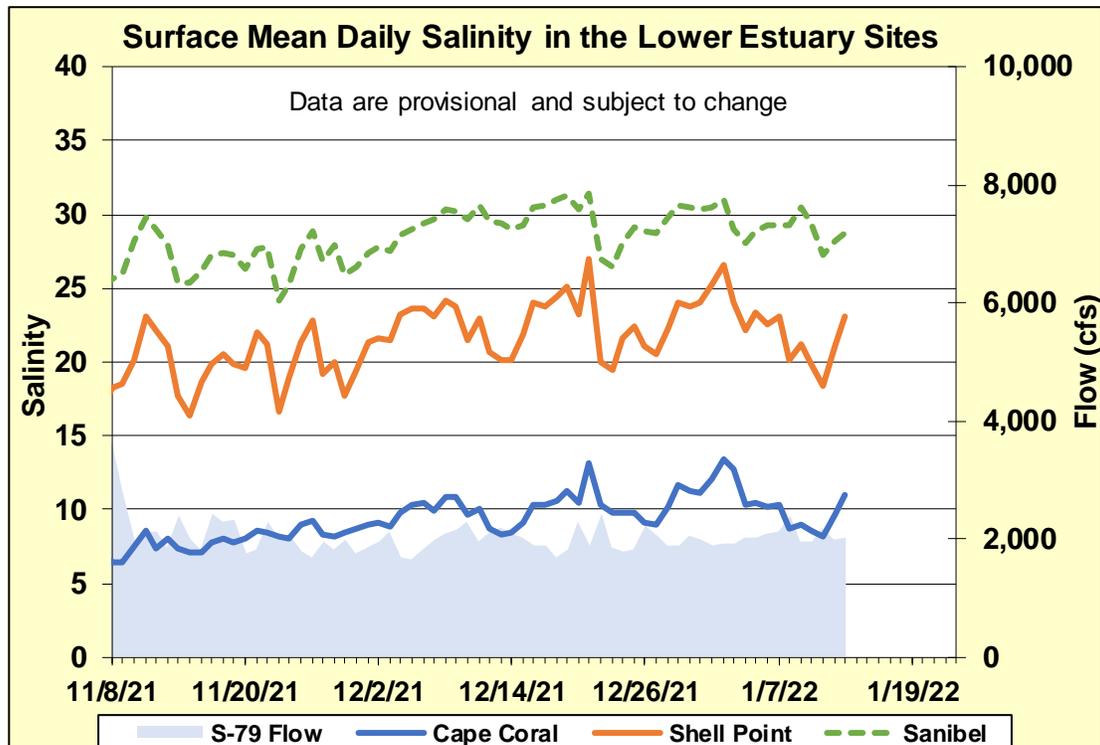


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

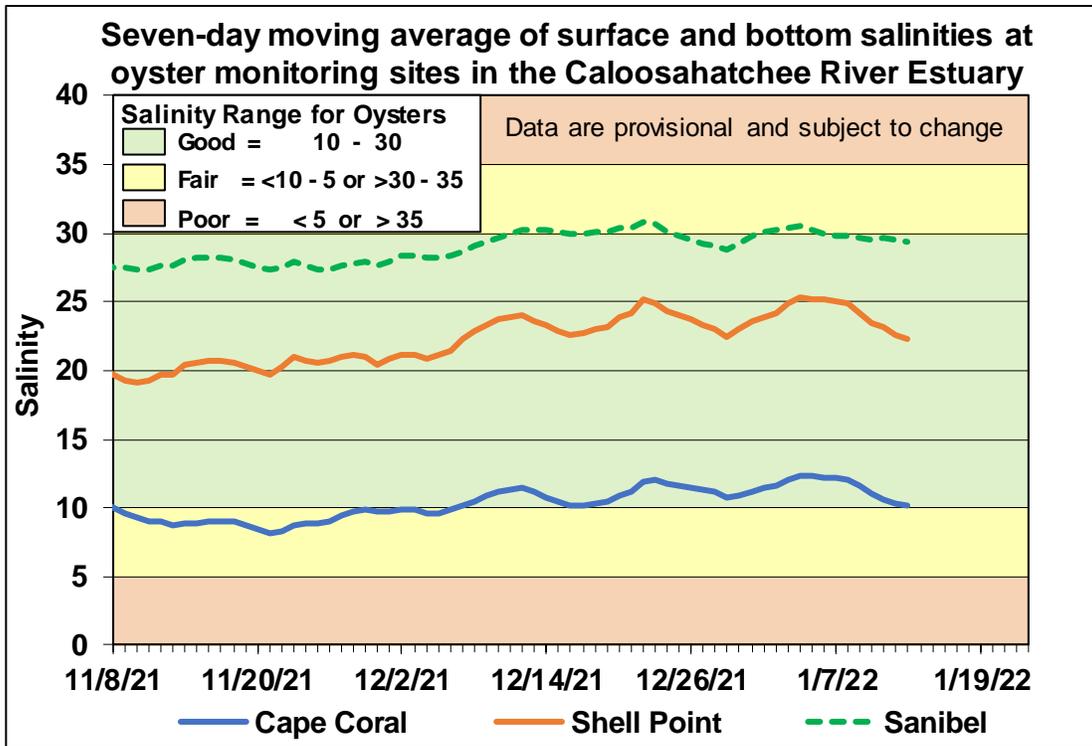


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

Table ES-3. Predicted salinity at Val I-75 in the Caloosahatchee River Estuary at the end of the forecast period for various S-79 flow release scenarios.

Scenario	Simulated S-79 Flow (cfs)	Tidal Basin Runoff (cfs)	Daily Salinity	30-Day Mean Salinity
A	0	92	1.0	0.3
B	450	92	0.4	0.3
C	800	92	0.3	0.3
D	1000	92	0.3	0.3
E	1500	92	0.3	0.3
F	2000	92	0.3	0.3

Caloosahatchee River Estuary Flows and Salinity
Observed and Forecast Salinity at Val I-75
S-79 = 0 cfs & TBR = 92 cfs

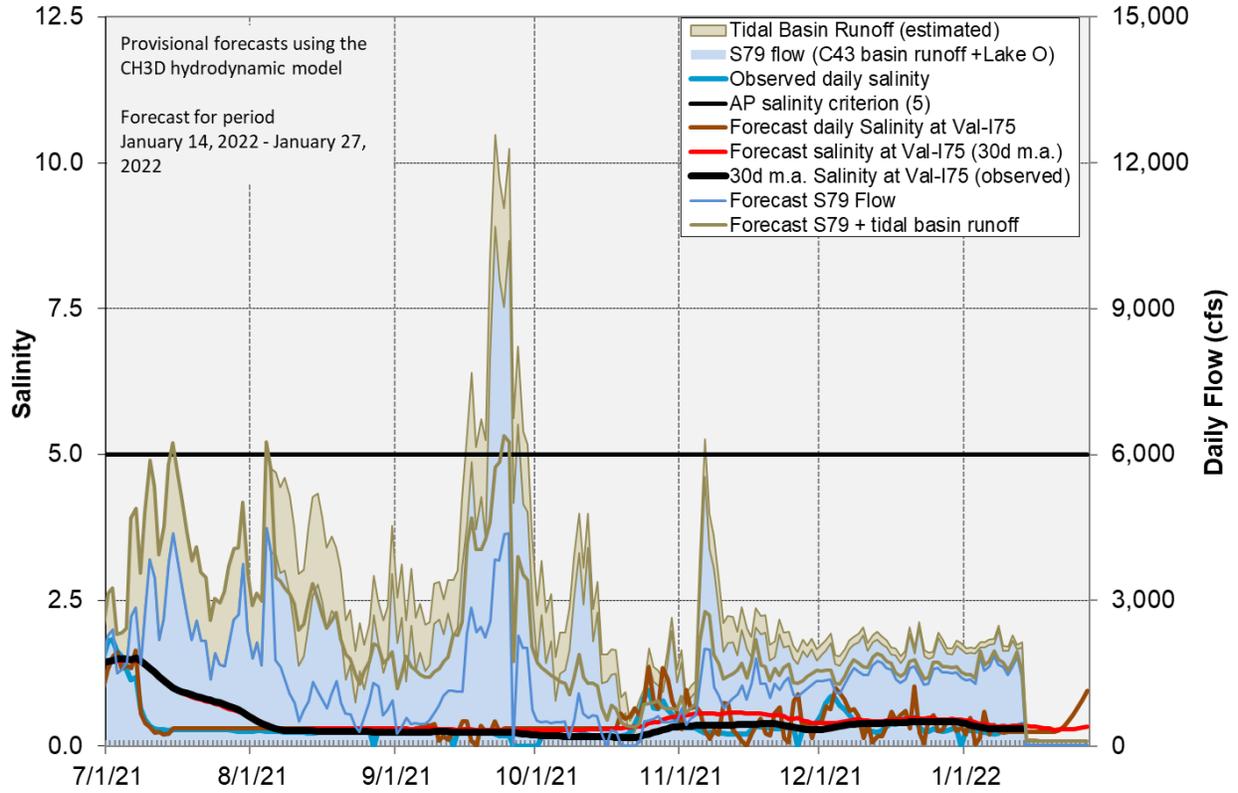


Figure ES-10. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

STA-1E: STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7. Operational restrictions are in place in STA-1E Central Flow-way for vegetation management activities. Online treatment cells are at or above target stage and vegetation in these cells is stressed and highly stressed. The 365-day phosphorus loading rates (PLRs) are high for the Eastern and Central Flow-ways (**Figure S-1**).

STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to construction activities. Most treatment cells are at or near target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for the Northern, Western, and Eastern Flow-ways are below 1.0 g/m²/year (**Figure S-2**).

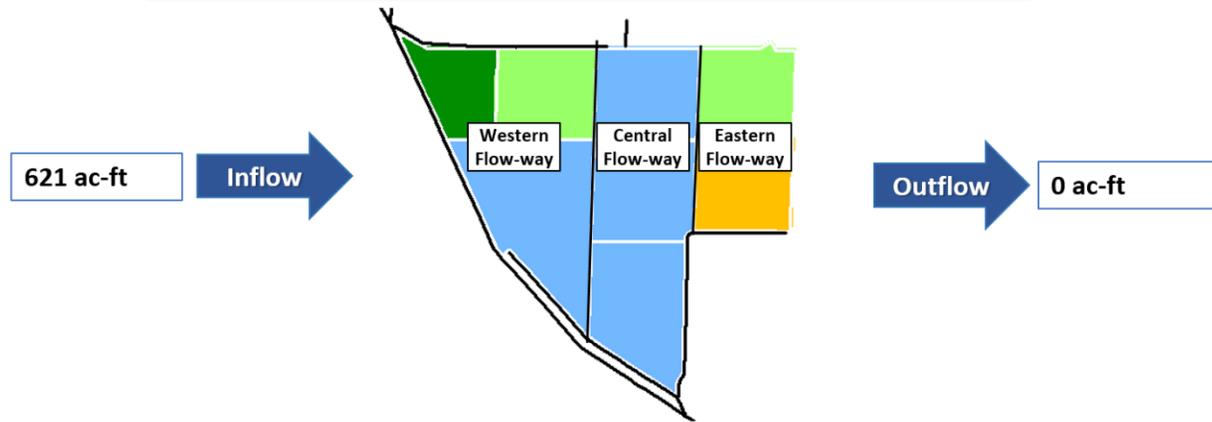
STA-2: STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are at or near target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 1, 4 and 5 are below 1.0 g/m²/year. The 365-day PLR for Flow-way 3 is high (**Figure S-3**).

STA-3/4: STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Most online treatment cells are at or near target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for the Central and Western Flow-ways are below 1.0 g/m²/year (**Figure S-4**).

STA-5/6: All Flow-ways are online. Most treatment cells are below target stage. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy. The 365-day PLRs for flow-ways 1, 6, 7, and 8 are below 1.0 g/m²/year. The 365-day PLRs for flow-ways 4 and 5 are high. (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

STA-1E Weekly Status Report – 01/10/2022 through 01/16/2022



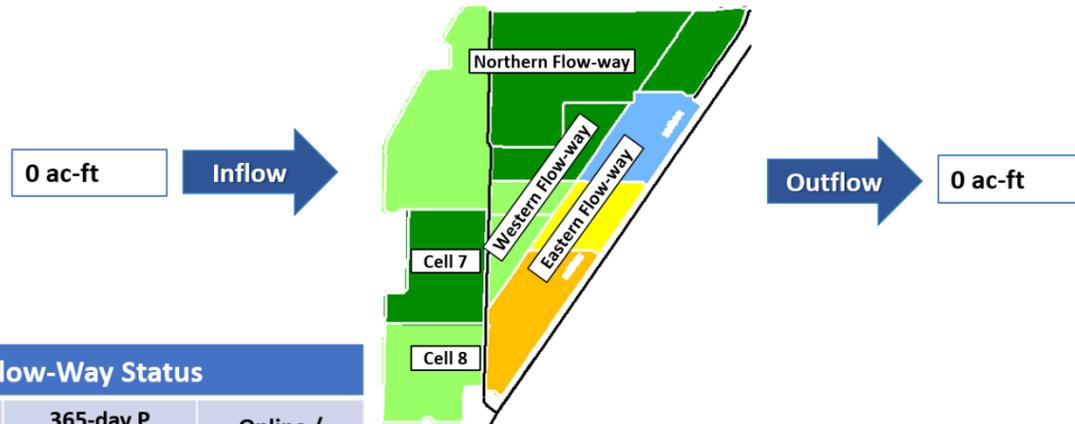
STA-1E Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
Eastern	← →		Online
Central	← →		Vegetation Rehab
Western	Offline, construction activities starting 11/01/2019		

As of 01/16/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-1E Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	621	3,279	178,877
--Lake Inflow, ac-ft	0	N/A	5,800
Total Outflow, ac-ft	0	2,697	150,633
Inflow Conc., ppb	45	54	122
Outflow Conc., ppb	N/A	28	23
Includes Preliminary Data			

Figure S-1. STA-1E Weekly Status Report

STA-1W Weekly Status Report – 01/10/2022 through 01/16/2022



STA-1W Flow-Way Status

Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
Northern	← →	1.0	Construction
Western	← →	1.0	Construction
Eastern	← →	1.0	Construction
Cell 7	← →	N/A	Construction
Cell 8	← →	N/A	Construction

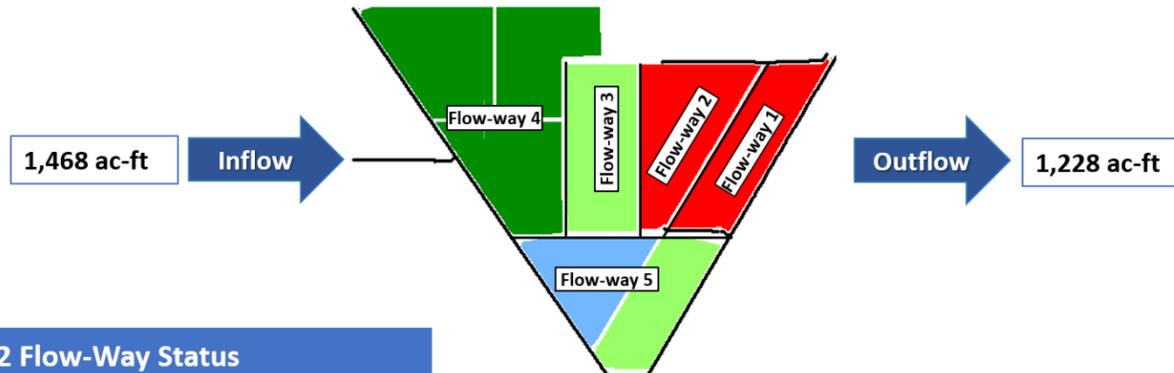
As of 01/16/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-1W Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	0	1,343	51,527
--Lake Inflow, ac-ft	0	N/A	4,500
Total Outflow, ac-ft	0	451	52,279
Inflow Conc., ppb	N/A	138	171
Outflow Conc., ppb	N/A	20	24
Includes Preliminary Data			

Figure S-2. STA-1W Weekly Status Report

STA-2 Weekly Status Report – 01/10/2022 through 01/16/2022



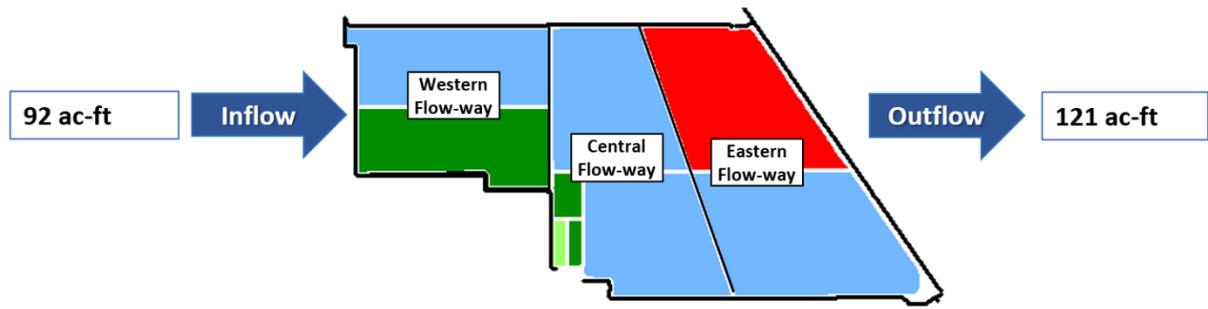
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 01/16/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	1,468	4,005	323,730
--Lake Inflow, ac-ft	1,000	N/A	68,100
Total Outflow, ac-ft	1,228	3,470	332,780
Inflow Conc., ppb	64	60	87
Outflow Conc., ppb	12	16	16
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

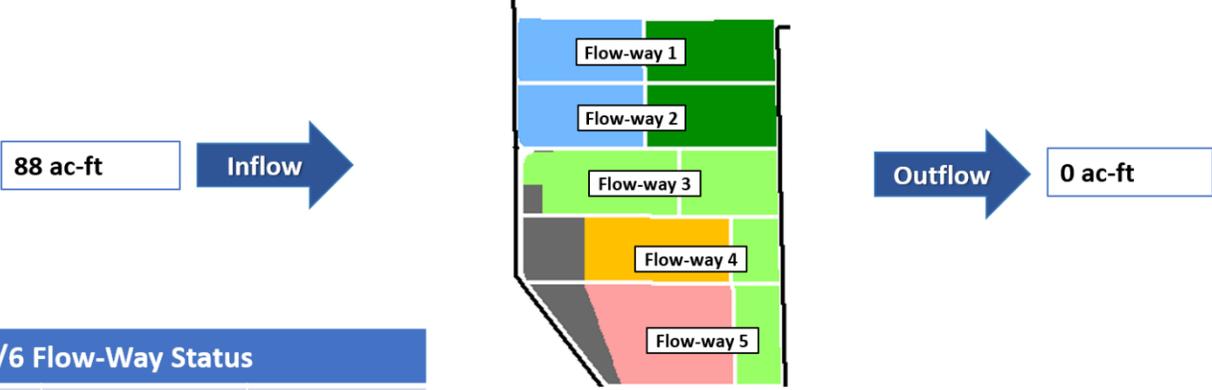
STA-3/4 Weekly Status Report – 01/10/2022 through 01/16/2022



STA-3/4 Flow-Way Status				As of 01/16/2022		STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small>	365-day P Loading Rate <small>(below 1.0 g P /m²/yr is optimal)</small>	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)			7-day	28-day	365-day
Eastern	Offline, vegetation management drawdown as of 3/1/2021			<ul style="list-style-type: none"> Deep Water Level (> 2.8' above TS) High Water Level (1.5' – 2.8' above TS) 0.2' – 1.5' above TS Target Stage (TS +/- 0.2') Low Water Level (<0.2' below TS) 		Total Inflow, ac-ft	92	95	361,143
Central	← →		Online	Depth / Area Based: Percent of Area Dry		--Lake Inflow, ac-ft	100	N/A	39,600
Western	← →		Online	<ul style="list-style-type: none"> 0-25% Dry 25-50% Dry 50-75% Dry 75-100% Dry 		Total Outflow, ac-ft	121	306	316,473
						Inflow Conc., ppb	36	36	65
						Outflow Conc., ppb	22	22	15
						Includes Preliminary Data			

Figure S-4. STA-3/4 Weekly Status Report

STA-5/6 Weekly Status Report – 01/10/2022 through 01/16/2022



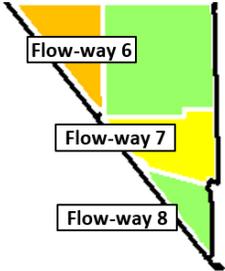
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1	← →		Online
2	← →	N/A	Online
3	← →	N/A	Online
4	← →		Online
5	← →		Online

As of 01/16/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	75-100% Dry
	50-75% Dry

STA-5/6 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	88	860	177,044
--Lake Inflow, ac-ft	0	N/A	9,000
Total Outflow, ac-ft	0	474	168,682
Inflow Conc., ppb	83	101	244
Outflow Conc., ppb	N/A	14	50
Includes Preliminary Data			

Figure S-5. STA-5/6 Weekly Status Report (Flow-ways 1 – 5)

STA-5/6 Weekly Status Report – 01/10/2022 through 01/16/2022



STA-5/6 Flow-Way Status				As of 01/16/2022		
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)		
				Deep Water Level (> 2.8' above TS)	High Water Level (1.5' – 2.8' above TS)	
6	←-----→	 1.0	Online	0.2' – 1.5' above TS	Target Stage (TS +/- 0.2')	
7	←-----→	 1.0	Online	Low Water Level (<0.2' below TS)	Depth / Area Based: Percent of Area Dry	
8	←-----→	 1.0	Online	0-25% Dry	50-75% Dry	
				25-50% Dry	75-100% Dry	

Figure S-6. STA-5/6 Weekly Status Report (Flow-ways 6 – 8)

Basic Concepts and Definitions for STA Weekly Status Report

- **Inflow:** Sum of flow volume at all inflow structures to an STA.
- **Lake Inflow:** Portion of the STA total inflow volume that originates from Lake Okeechobee.
- **Outflow:** Sum of flow volume at outflow structures from an STA.
- **Total Phosphorus (TP):** Total mass of phosphorus in all its forms; including particulate, dissolved, etc.
- **Inflow Concentration:** TP concentration is the mass of TP in micrograms per liter of water, $\mu\text{g/L}$ or ppb. Inflow concentration refers to the flow-weighted mean TP from all inflow structures over a period of time.
- **Outflow Concentration:** The flow-weighted mean TP from all outflow structures over a period of time. The outflow concentration represents the reduction of inflow TP achieved by STA treatment of the inflow water.
- **WQBEL:** The STA outflow concentration that is required upon completion of the Restoration Strategies projects by December 2025. The outflow concentration shall not exceed 13 ppb as an annual flow weighted mean in more than 3 out of 5 water years on a rolling basis and shall not exceed 19 ppb as an annual flow weighted in any water year.
- **Flow-Way (FW):** One or more treatment cells connected in series. Cells typically have emergent aquatic vegetation (EAV) in the front portion of the flow-way followed by a mix of EAV and submerged aquatic vegetation (SAV)
- **Vegetation Status:** Healthy means the vegetation condition is good and will allow the STA to perform as designed. Stressed means the vegetation is showing signs of poor health, such as browning or areas of vegetation die-off, or the cell contains undesirable vegetation such as floating exotic vegetation requiring treatment. The TP reduction capability of the STA is affected when the vegetation condition is poor.
- **Phosphorus Loading Rate (PLR):** Mass of inflow TP in grams, divided by total treatment area of STA in square meters, per year. In general, a 365-day value of less than 1.0 is needed for an STA to perform optimally. A PLR of 2.0 is considered very high and a PLR of 3.0 is considered extremely high. The TP reduction capability of the STA is affected when the PLR is high, very high and extremely high.
- **Online:** Online status means the FW can receive and treat inflow.
- **Online with Restriction:** The FW can receive and treat inflow, but the amount of flow or water level may be limited temporarily. For example, a vegetation rehabilitation effort may require reduced flows through an area while the new plants are establishing, or nesting by protected species may require a certain water level not to be exceeded.
- **Offline:** The FW is unable to receive and treat inflow due to repairs, construction, or other prohibitive reasons.
- **Depth:** Difference between the average surface water level in a cell and the average ground elevation in that cell. Target depths, or depths between flow events, are between 1.25 ft to 1.5 ft. As depth approaches or drops below zero, an increasing percentage of the cell is considered dry and STA conditions deteriorate. An increase in depth above target depth is expected with increasing flow. However, as depth increases much above the target depth and is sustained over a period of time, it can be detrimental to vegetation health and overall STA treatment performance.
- **Note:** The data provided in this summary report were developed using a combination of provisional and quality-assured flow and water quality data. In some cases, best professional judgment was used to estimate missing data and revise questionable data. Values provided are not considered final but are appropriate for use in STA operational decision-making.

Everglades

Water Conservation Area Regulation Schedules

WCA-1: The 1-8C stage continues to fall in parallel or slightly slower than the Zone A1 regulation line last week. The average on Monday was 0.33 feet above.

WCA-2A: Stage change at 2A-17 slowed last week; the average at that gauge on Monday was 1.21 feet higher than the regulation line.

WCA-3A: Last week the Three Gauge Average stages continued to fall away from the falling Zone A regulation line; average stage was 0.62 feet below that line on Monday. (compared to 0.58 and 0.52 feet the two weeks prior). WCA-3A: Stage at gauge 62 (Northwest corner) moved slightly upwards late last week, the average on Monday was 0.90 feet below the regulation line (**Figures EV-1 – EV-4**).

Water Depths

The SFWDAT tool indicates that water depths in the WCAs remain the lowest in northeastern WCA-3A, where the spatial extent of the potential for water below the soil surface continues to expand just south of the S-150. North to South hydrologic connectivity has diminished but remains in Taylor Slough in eastern Everglades National Park while to the west in Lostman's slough the connection has diminished more significantly. The western marl prairies and southern BCNP are dry (**Figure EV-5**). Comparing current WDAT water depths to the depth one month ago, stages are decreasing in most areas, most significantly in southern WCA-2A and in the upper reaches of the L-67s in WCA-3A. Looking back one year, most of the EPA is significantly lower in depth (particularly WCA-3A and 3B) with only WCA-1 and northeastern ENP close to the same depth as last year (**Figure EV-6**). Comparing current depths to the past 20 years, most of WCA-3A is near the 30th percentile while WCA-1 and northeastern ENP remain in the 90th percentile (**Figure EV-7**).

Taylor Slough and Florida Bay

A spatial average of 0.90 inches of rain fell over Taylor Slough and Florida Bay on Sunday, January 16, 2022, which was more than 3 times the amount that fell during the rest of the week leading up to Sunday. The effects of that rain will carry into the beginning of this coming week. Stages decreased by only 0.01 feet over the week as the rain and inflows slowed recession (**Figures EV-8 and EV-9**). The Upper Taylor Slough area is a foot higher than the average from before the Florida Bay Initiative modifications, but still 5 inches lower than this time last year after the high-water event caused by Tropical Storm Eta. Given the expectation of a drier than average dry season, maintaining water deliveries to the area would help to slow the recession in the slough so water movements south can be expedited when the wet season starts.

Salinities in Florida Bay averaged an increase of 3.4 over the week ending January 16, 2022, with individual station changes ranging from -0.8 to +12.4 (**Figure EV-8**). The largest changes were increases in the nearshore area caused by upstream flows that persisted most of the week. The increase in the nearshore area drove the regional

averages up rapidly over the week (**Figure EV-10**). Conditions are not ideal for enduring a drier than average dry season. Bay-wide salinity is averaging 3 higher than the historical average while there is less water in the upstream Slough compared to last year.

Water Management Recommendations

Flows directed across the northern perimeter of WCA-3A that assist recession rates in that sub-basin then move downstream have an ecological benefit if those discharges can slow the recession rates in that sub-basin. If conditions allow discharges into both the western (to assist in maintaining current foraging conditions) and the eastern (i.e., S-150 to help maintain stage around the Alley North colony) WCA-3A water control structures has greater benefit than discharges to the west alone. Continued freshwater to the Taylor Slough area, a discharge amount that maintains stage will help expedite deliveries to the south when the wet season begins. Individual regional recommendations can be found in **Table EV-2**.

Table EV-2. Previous week’s rainfall and water depth changes in Everglades regions.

Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	0.42	-0.03
WCA-2A	0.59	-0.08
WCA-2B	0.66	-0.06
WCA-3A	0.64	-0.06
WCA-3B	0.46	ERROR*
ENP	0.60	+0.00

* sensor not reporting (other two gauges report -0.03)

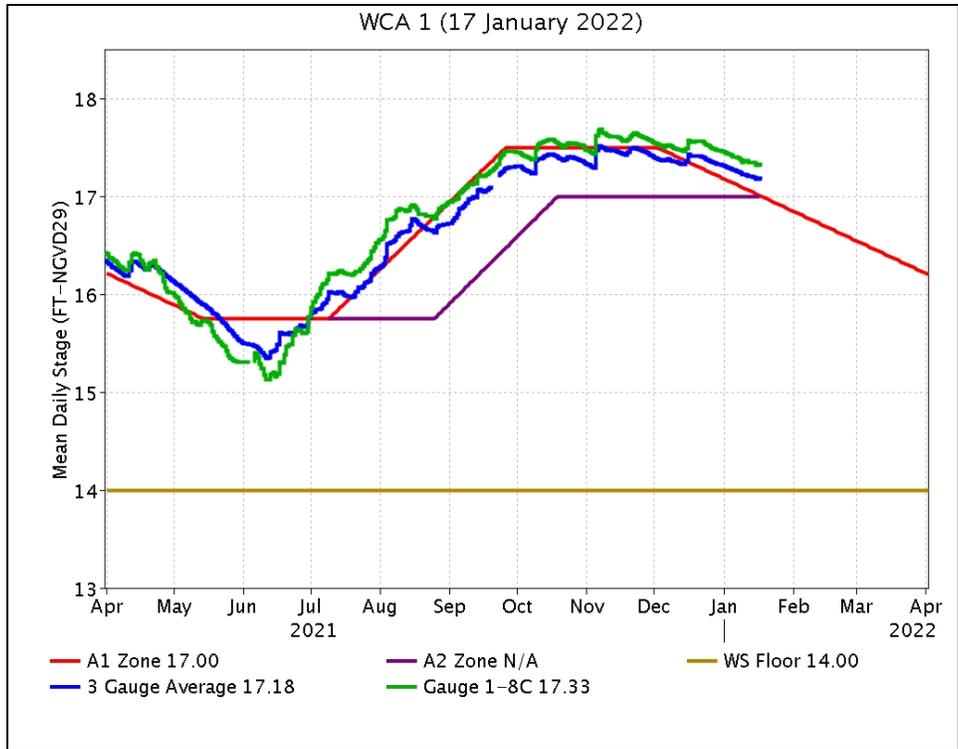


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

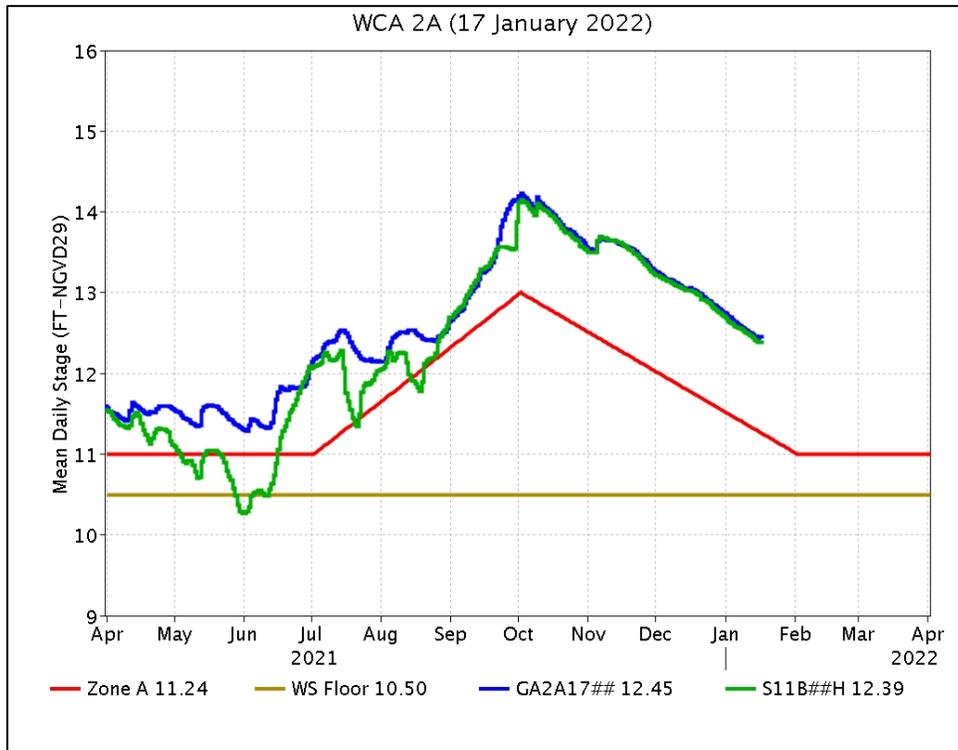


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

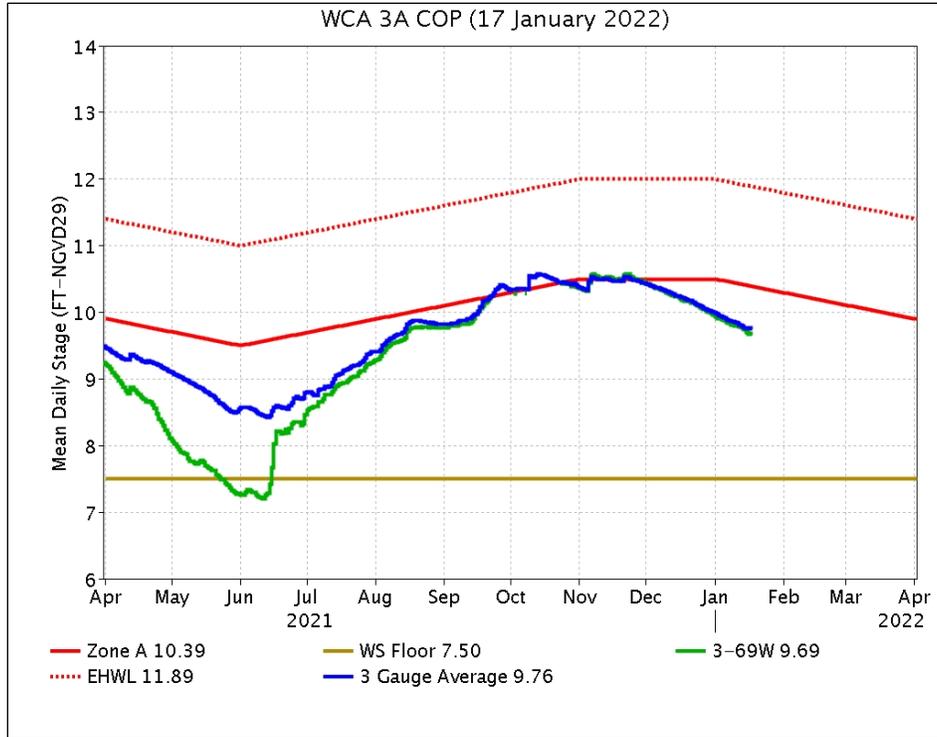


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

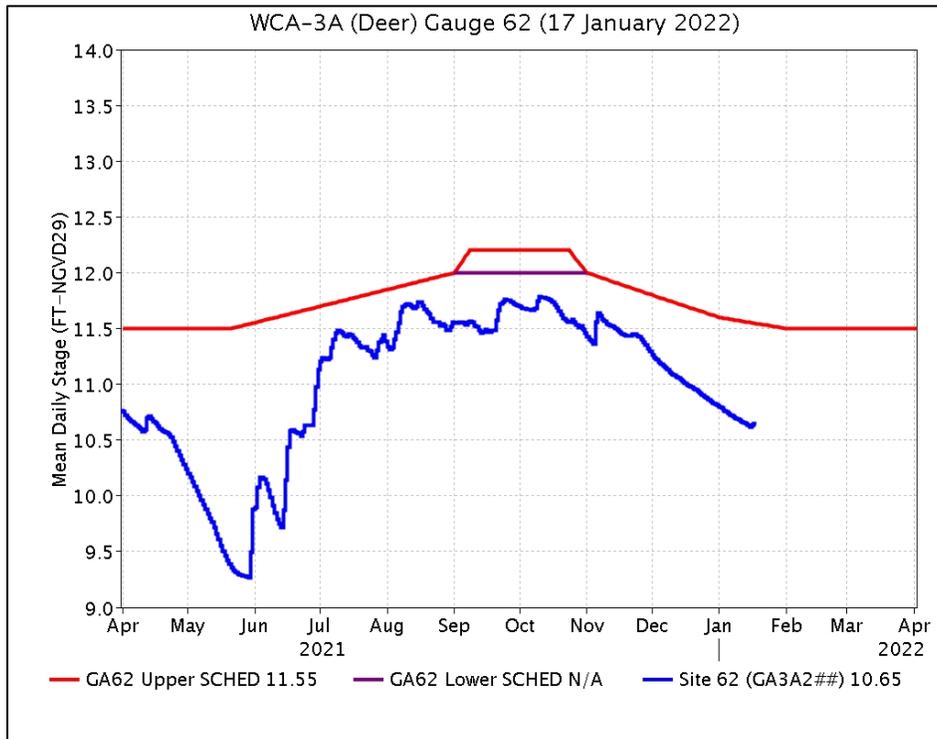


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

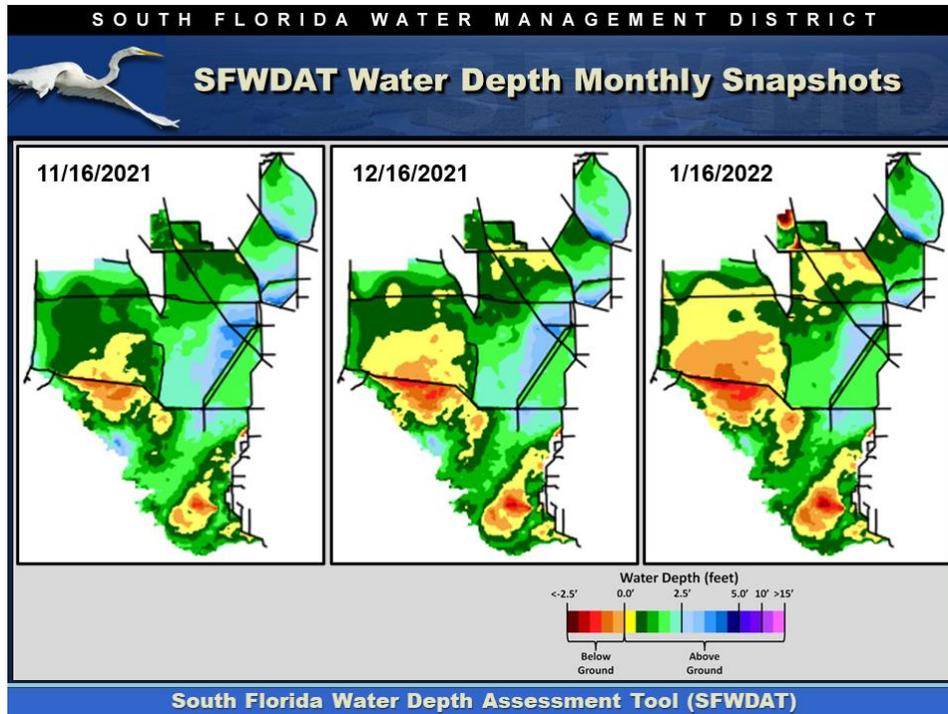


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

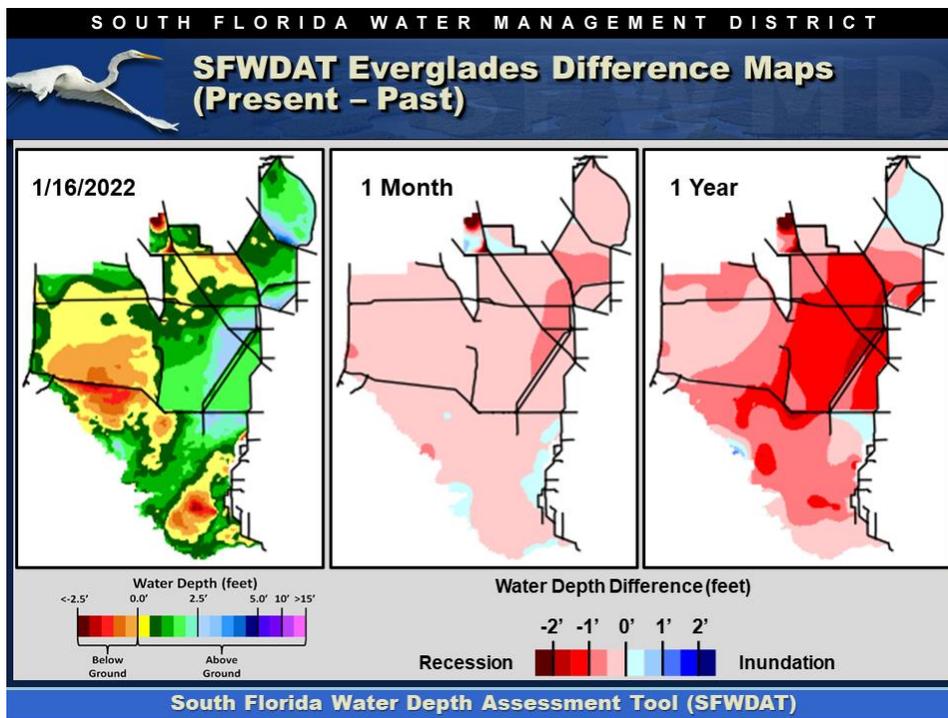


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

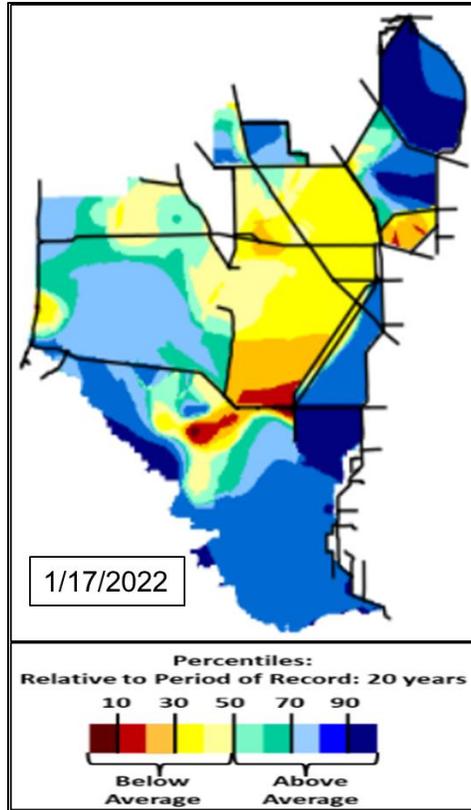


Figure EV-7. Present water depths compared to the day of year median over the previous 20 years.

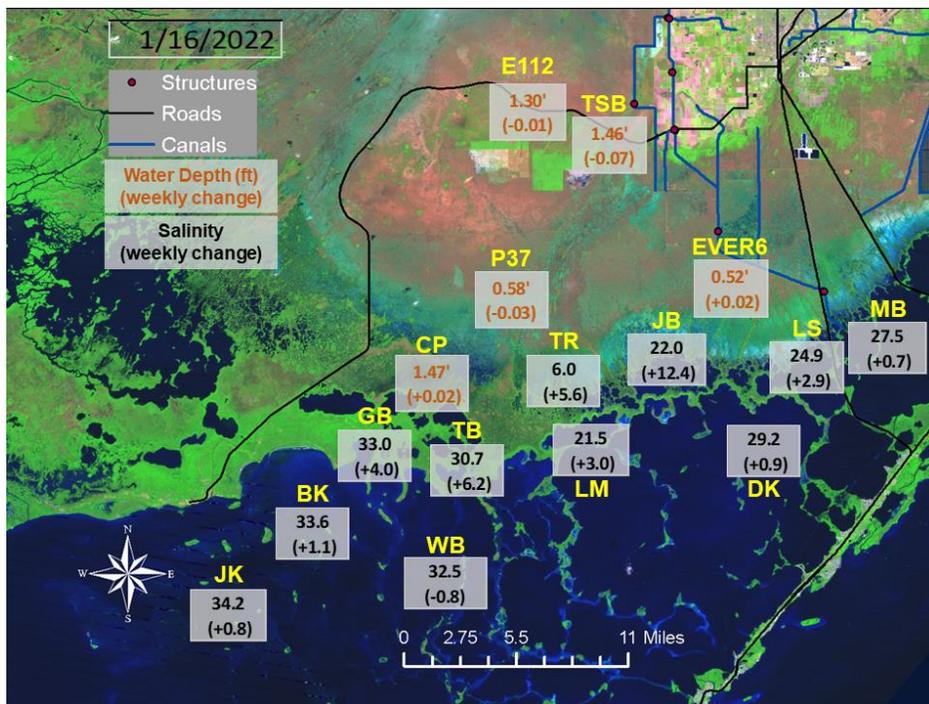


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

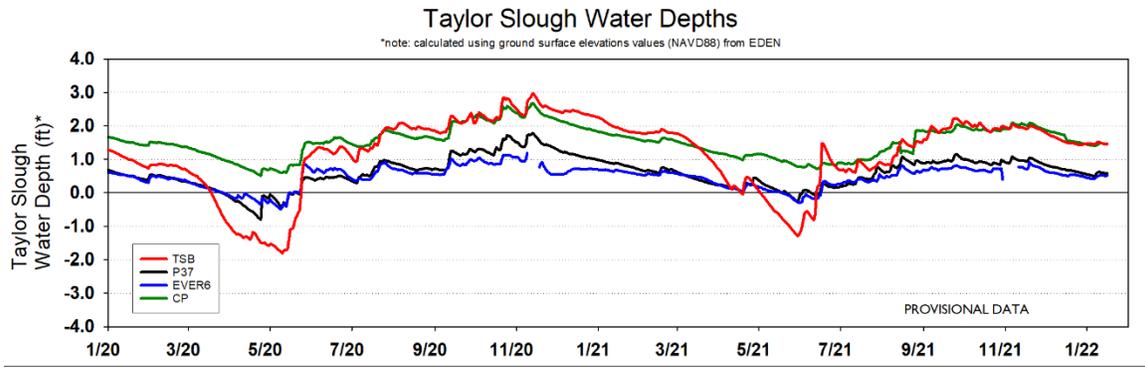


Figure EV-9. Taylor Slough water depth time series.

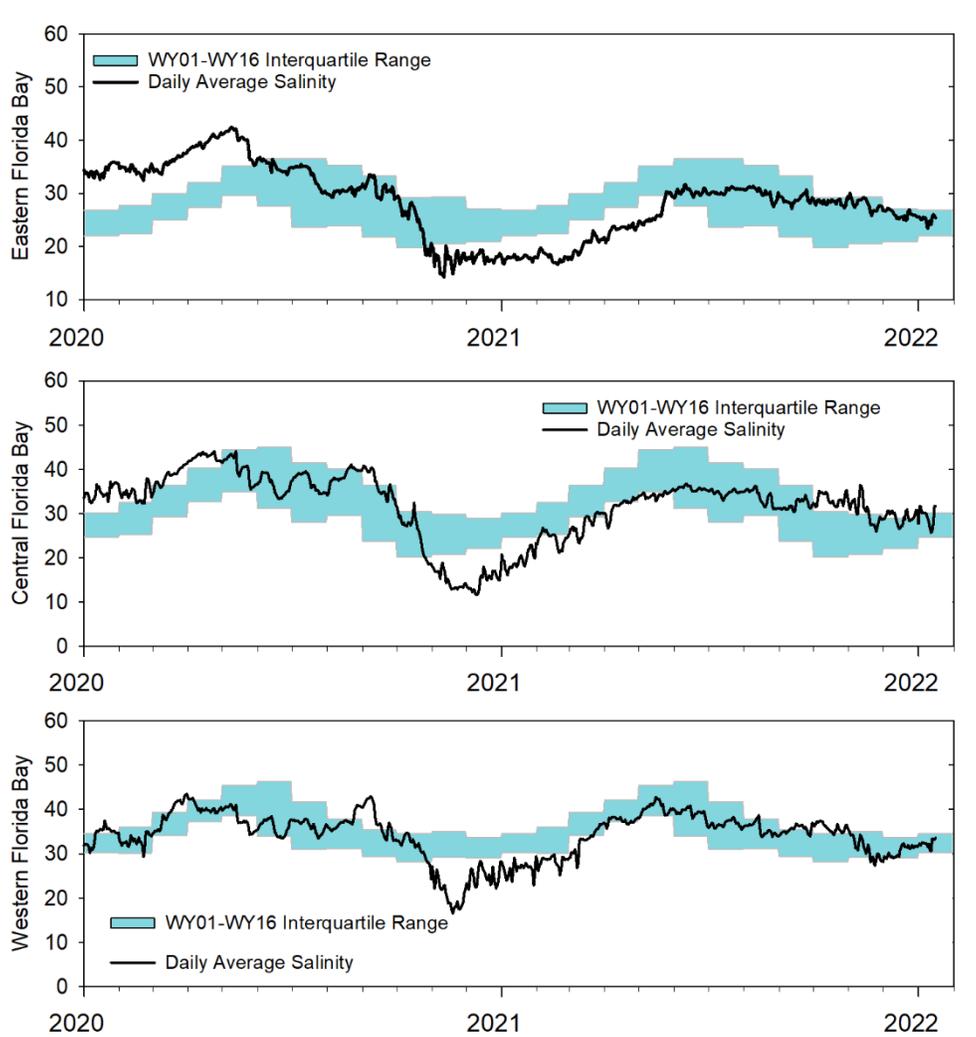


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

Table EV-2. Weekly water depth changes and water management recommendations

SFWMD Everglades Ecological Recommendations, January 18, 2022 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.03'	Conserve water in this basin letting the water move south when conditions allow.	Protect within basin and downstream habitat and wildlife. Anticipated La Nina dry season.
WCA-2A	Stage decreased by 0.08'	Conserve water in this basin letting the water move south when conditions allow, with northern WCA-3A as the priority for receiving discharge. Keeping a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin and downstream habitat and wildlife. Protect wading bird foraging conditions in WCA-3A North.
WCA-2B	Stage decreased by 0.06'	Conserve water in this basin, maintain a minimum input to maintain stage while moving water south when conditions allow.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage decreased by 0.10'	Conserve water in this basin, while letting the water move south when conditions allow. Keeping a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin peat soils, wading bird foraging and downstream habitat and wildlife. Maintaining stage above 9.5' NGVD at 3A-3 (or gauge 63) prior to March 15 will increase the probably of nesting at the Alley North colony.
WCA-3A NW	Stage decreased by 0.02'	Conserve water in this basin letting the water move south when conditions allow. Keeping a recession rate less than 0.10 feet per week has an ecological benefit.	
Central WCA-3A S	Stage decreased by 0.09'	Conserve water in this basin letting the water move south when conditions allow. Keeping a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage decreased by 0.05'		
WCA-3B	Stage decreased by 0.03'	Conserve water in this basin letting the water move south when conditions allow.	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage remained unchanged	Make discharges to the Park according to COP and TFFF protocol while considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife.
Taylor Slough	Stage changes ranged from -0.07' to +0.03'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -0.8 to +12.4	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.